

A Survey of the Geographic Area, Altitude, Coastline, and Climate of African Countries and Regions: Implications for Africa's Development

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Abstract

This study examines the area, altitude, coastline, and climate of African nations. Africa's 1.448 billion people in 2023 accounted for 18.14% of the world total of 7.979 billion, and its landmass of 30.32 million sq km, is 20% of the world total of 148.94 million sq km. Africa's total coastline of 40,188 km is 11.3% of the world total of 356,000 km. Of Africa's total area of 30,319,532 sq km, 574,393 sq km (2% excluding South Sudan) is water. There are 12 nations in Africa, each with an area of 1 million sq km or more. There are 16 nations in Africa with an average elevation ranging from over 1,000 meters to over 3,000 meters; and 17 nations with a peak elevation level of 3,000 meters or higher. Of 40 nations with hottest day temperature data, 5 (12.5%) are below 100 degrees; and 35 (87.5%) have figures ranging from 101.84 degrees to 124.34 degrees. Twenty-two nations (55% of 40) have coldest day temperatures in the 30s or lower; and 15 (37.5%) nations with temperatures of 32 degrees or less. There are 12 nations in Africa with average annual humidity figures of 60% or less. The study recommends that the African union lead the way in utilizing Africa's strategic natural resources for its development. The study recommends that the African Union must work with the United States to ease the transition process for Black people returning to Africa from the United States in utilizing their expertise and wealth for Africa's development.

Keywords: Africa, coastline, elevation from sea level, altitude, rainfall, tropics, temperature, population, African Union, African diaspora, development, United States, temperate climates

1. Introduction

The study of the geographic area of Africa, Africans in Africa, and the African diaspora, always tend to illustrate contradictions. Africans are rich and poor. For example, Africa has one of the highest proportions of prime working age populations in the world. However, this has not resulted in the economic benefits that one would expect from this phenomenon. Africa has large deposits of all types of natural resources and massive amounts of fertile lands, yet the continent remains relatively poor. It is the continent at the greatest risks of disease epidemics yet was the least impacted by the COVID-19 pandemic in terms of infections and deaths (Kaba, 2006a, 2007abc, 2014, 2020, 2024; Mazrui and Kaba, 2016; Kaba and Kaba, 2020; Sackeyfio and Kaba, 2022).

Interestingly, Africa's population as a share of the world population is almost that of its landmass proportion as percent of the world. In 2023, Africa's 1,447,549,975 population is 18.14% of the world population of 7,979,261,010. Its landmass of 30.32 million sq km is 20% of the world total landmass of 148.94 million sq km. Africa's total coastline of 40,188 km is 11.3% of the total 356,000 km coastline of the world (Compiled and computed from the 2023 CIA World Factbook; Table A1). However, this current study finds a reverse of some of these paradoxes, whereby the continent of Africa is endowed with many countries and regions having temperate climates than the conventional understanding of Africa as a very hot continent. It is reported that the length of Africa from its northernmost point in northern Tunisia (Cape Angela) to its southernmost point in South Africa (Cape Agulhas), is 8000 km (4,971 miles) (Collins, 2011:3658). According to Collins (2011): "Africa has eight climate zones according to the Ko'ppen climate classification system. The northern half of Africa is primarily desert or arid, while the central and southern areas contain savanna and rain forest regions" (p.3650).

By 2024, one can find temperature extremes in the United States and Europe than the extremes one would find in many countries and regions across Africa. Even though over three quarters of countries in Africa are classified as

tropics, because they are located between the Tropic of Cancer and the Tropic of Capricorn, the continent is not as hot as perceived. The geographic territory of Africa has many characteristics or indicators of a temperate zone than one would expect. This study shows that even though Africa is in the Southern Hemisphere of the globe, it has high altitude (above sea level) countries and regions and regular and substantial rainfalls linked to temperate climates, than one would expect. According to Coughlan de Perez et al. (2023): "... many major studies highlight the tropics as an area of concern for extreme heat under climate change. ... [a study] found that the tropics saw a greater number of exceedance of historical annual maximums in the future with climate change, compared to the rest of the world. However, they acknowledge that this is likely due to the low variability of temperatures in the tropics" (p.3). However, the study by Collins (2011) claims that: "It should be noted that for every region examined, the trend in the Southern Hemisphere (whole of Southern Hemisphere, tropical and subtropical Southern Hemisphere) was always smaller than the Northern Hemisphere counterpart. This is consistent with previous work [by scholars] who note that globally the Northern Hemisphere is warming faster than the Southern Hemisphere" (pp.3658-3659). This study illustrates that there are many countries and regions across Africa with temperate climates. Pratolongo et al. (2019) claim that: "Temperate climates of the Earth are characterized by relatively moderate mean annual temperatures, with average monthly temperatures above 10°C [50 degrees Fahrenheit] in their warmest months and above -3°C [26.6 degrees] in their colder months" (also see "Temperate Climates," 2024).

This study is important because there continues to be scarcity in the number of studies on the altitude, climate and temperature trends across Africa. According to Collins (2011): "There have been few studies about climate change focusing on temperature that consider the whole of Africa. Part of the reason for this may be that ... there are large regions in the world where no digital data are readily available for analysis" (p.3650). In addition, this study is useful to people residing in Africa as a source of useful climate data as increasing numbers of them continue to relocate to higher elevation regions in different parts of the African continent because of their temperate climates. This study is also useful to the increasing numbers of people in the African diaspora, especially in the United States now relocating part-time or full-time to different parts of Africa. Those seeking temperate climates in Africa would use this study as a source of useful information as they make their decisions as to where to relocate on the continent.

This study examines the area, altitude, coastline, and climate of African countries and regions. The study begins with an explanation of the methodology. Next, the study presents the findings. Next, the paper presents a discussion section of the study. This last section of the study will focus on the role of the African Union in leading the way in utilizing the important natural resources of Africa for its development.

2. Methodology, Data Availability and Limitations of the Study

The data for the variables in this study are compiled from various entities or organizations. The reason is that there is no one organization that provides all the variables covered in this study. In addition, there continues to be limitations in the availability of climate and other relevant climate or weather-related data for various countries in Africa. For example, in discussing the ongoing challenges of finding weather or climate data for African countries, Collins (2011) points to "some of the problems in trying to establish a weather station network that includes the technological and scientific underdevelopment of many African countries exacerbated by civil war, extensive poverty, and political instability. In addition... Africa has been underrepresented in international efforts to improve research capabilities, observing facilities, operational forecasting, and meteorological education" (p.3650). Collins (2011) adds that:

"...weather stations first emerged in the south of Africa and then along the coasts. These locations would therefore have the longest records.... the lack of temperature measurements in Africa (and other locations such as South America) in comparison to North America and Europe. ... the network of 1152 World Meteorological Organization (WMO) World Weather Watch (WWW) stations in Africa has an average density of weather stations of just one per 26 000 km² (this is 8 times lower than the minimum recommended level given by the WMO). The location of these weather stations is also unevenly distributed. Of the operational weather stations, some do not have long climate records and some are not publically available" (p. 3650).

The country/entity population, area (land and water), and coastline data are compiled from the 2023 CIA World Factbook (<https://www.cia.gov/the-world-factbook/>). The data for the average elevation, highest and lowest points, and the names of their locations are compiled from the 2023 CIA World Factbook. However, in instances where the World Factbook did not provide the data, I found them from various trusted sources. The temperature data for 1921 and 2021 are compiled from the World Bank's "Climate Change Knowledge Portal" (<https://climateknowledgeportal.worldbank.org/country-profiles>). The data for the coldest and hottest day

temperatures recorded, the month, year and location where they occurred in the past 114 years (the years range based on the country or region from 1914 to 2023), and climate zone data are from WorldData.info, a project of eglitis-media, based in Germany (<https://www.worlddata.info/about.php>). For the hottest and coldest day variables and the average annual temperatures for 1921 and 2021, I converted the numbers from Celsius to Fahrenheit. The most humid city/town in 2023 data in Table B1-6 are compiled from a study by a publication called HouseFresh, which focuses "... on air quality" (<https://housefresh.com/about/>; Ashton, 2023; <https://vividmaps.com/wp-content/uploads/2022/01/Most-Humid-Cities-World-Map.jpg>).

3. Findings

The results or findings of this study illustrate that the continent of Africa has a lot more countries and regions with high altitude and cool or temperate climates than one would expect given the perception of Africa as a whole, as a very hot continent. It is a fact that from the period from 10 am to 5 pm during the day most of the time the temperature in most African nations would be relatively high. However, the data show that for many months in the year, various countries and regions across Africa experience temperate climates or pleasant weather. Even in some countries where the temperature can go up to or above 100 degrees, they tend to have low relative humidity.

3.1 Population of Africa and Its Five Regions: 2023

Tables A1 to A6 show that the geographic territory of Africa is large to accommodate its massive population that continues to be the fastest growing in the world. According to Table A1, as of July 2023, Africa's total population was 1,447,549,975. Utilizing the United Nations Population Division's classification of the five regions of Africa, of Africa's total population in July 2023, Eastern Africa accounted for 467,068,423 (32.3%); Western Africa, 442,013,593 (30.5%); Northern Africa, 259,798,848 (17.9%); Middle Africa, 212,085,262 (14.7%); and Southern Africa, 66,583,849 (4.6%). It is useful to note that the population totals for Africa and Northern Africa do not include Western Sahara (652,271, 0.05% of Africa's total).

Nigeria is the most populous nation in Africa in 2023 at 230,842,743 (15.95% of Africa's total), followed by Ethiopia, 116,462,712 (8.1%), Democratic Republic of Congo, 111,859,928 (7.7%), Egypt, 109,546,720 (7.6%), Tanzania, 65,642,682 (4.53%), South Africa, 58,048,332 (4%), Kenya, 57,052,004 (3.94%), Sudan, 49,197,555 (3.4%), Uganda, 47,729,952 (3.3%), Algeria, 44,758,398 (3.1%), Morocco, 37,067,420 (2.6%), Angola, 35,981,281 (2.5%), Ghana, 33,846,114 (2.3%), Mozambique, 32,513,805 (2.25%), Cameroon, 30,135,732 (2.1%), Cote D'Ivoire, 29,344,847 (2.03%), Madagascar, 28,812,195 (2%), Niger, 25,396,840 (1.8%), Burkina Faso, 22,489,126 (1.6%), Mali, 21,359,722 (1.5%), Malawi, 21,279,597 (1.47%), Zambia, 20,216,029 (1.4%), Chad, 18,523,165 (1.28%), Senegal, 18,384,660 (1.27%), Zimbabwe, 15,418,674 (1.1%), Benin, 14,219,908 (1%), Guinea, 13,607,249 (0.94%), Rwanda, 13,400,541 (0.93%), Burundi, 13,162,952 (0.91%), Somalia, 12,693,796 (0.88%), South Sudan, 12,118,379 (0.84%), Tunisia, 11,976,182 (0.83%), Sierra Leone, 8,908,040 (0.62%), Togo, 8,703,961 (0.6%), Libya, 7,252,573 (0.5%), Eritrea, 6,274,796 (0.43%), Republic of Congo, 5,677,493 (0.39%), Central African Republic, 5,552,228 (0.38%), Liberia, 5,506,280 (0.38%), Mauritania, 4,244,878 (0.3%), Namibia, 2,777,232 (0.2%), Gambia, 2,468,569 (0.17%), Botswana, 2,417,596 (0.17%), Gabon, 2,397,368 (0.17%), Lesotho, 2,210,646 (0.15%), Guinea-Bissau, 2,078,820 (0.144%), Equatorial Guinea, 1,737,695 (0.12%), Mauritius, 1,309,448 (0.09%), Eswatini, 1,130,043 (0.08%), Djibouti, 976,143 (0.07%), Comoros, 888,378 (0.06%), Reunion, 787,584 (0.054%) (2006 estimate), Cabo Verde, 603,901 (0.042%), Mayotte, 231,139 (0.02%) (20210 estimate), Sao Tome & Principe, 220,372 (0.015%), Seychelles, 97,617 (0.007%), and Saint Helena, 7,935 (0.001%) (Table A1).

It is useful to note that the population figure of 652,271 for Western Sahara is included in the figure for Morocco, because that entity is currently politically a part of Morocco (Tables A1 and A4). However, for this study it is important to understand the climate and altitude and weather patterns of Western Sahara as an entity in Africa.

3.2 Area: Land and Water

Utilizing the United Nations Population Division's classification of the five regions of Africa, according to Table A1, the total area of Africa is 30,319,532 sq km (29,100,810 (95.9%) sq km of land, and 574,393 (1.9%) sq km of water. Note that the land and water data for South Sudan are not available, but the total area figure of 644,329 sq km is available, and it is part of the overall total above. It is also useful to note that the figure of 266,000 sq km as of 2004 (all land) for Western Sahara is not included in the Africa and North Africa totals because it is now included in the total for Morocco in the 2023 World Factbook. However, for this study it is important to understand the climate and altitude and topography of Western Sahara as an entity in Africa.

Of Africa's total area of 30,585,532 sq km, Northern Africa accounted for 7,884,374 (26%) sq km (7,740,061 (98.2%) sq km of land and 144,313 (1.8%) sq km of water); Eastern Africa, 7,005,860 (23.1%) sq km (6,150,321

(87.8%) sq km of land and 211,210 (3%) sq km of water; the remaining 9.2% represents the missing land and water figures for South Sudan); Middle Africa, 6,612,664 (21.8%) sq km (6,496,824 (98.2%) sq km of land and 115,840 (1.8%) sq km of water); Western Africa, 6,143,803 (20.3%) sq km (6,061,555 (98.7%) sq km of land and 82,248 (1.3%) sq km of water); and Southern Africa, 2,672,831 (8.8%) sq km (2,652,049 (99.2%) sq km of land and 20,782 (0.8%) sq km of water (Tables A1 to A6).

There are 12 nations in Africa with an area of 1 million sq km or more, with Algeria, (2,381,740 sq km, all land) accounting for the largest area in the continent, followed by the Democratic Republic of Congo, 2,344,858 sq km (2,267,048 sq km of land and 77,810 sq km of water), Sudan, 1,861,484 sq km (1,731,671 sq km of land and 129,813 sq km of water), Libya, 1,759,540 sq km (all land), Chad, 1,284,000 sq km (1,259,200 sq km of land and 24,800 sq km of water), Niger, 1,267,000 sq km (1,266,700 sq km of land and 300 sq km of water), Angola, 1,246,700 sq km (all land), Mali, 1,240,192 sq km (1,220,190 sq km of land and 20,002 of water), South Africa, 1,219,090 sq km (1,214,470 sq km of land and 4,620 sq km of water), Ethiopia, 1,104,300 sq km (1,096,570 sq km of land and 7,730 sq km of water), Mauritania, 1,030,700 sq km (all land), and Egypt, 1,001,450 sq km (995,450 sq km of land and 6,000 sq km of water) (Tables A1 to A6).

The following nations in Africa have areas ranging from below 1 million sq km to above 500,000 sq km: Tanzania, 947,300 sq km (885,800 sq km of land and 61,500 sq km of water), Nigeria, 923,768 sq km (910,768 sq km of land and 13,000 sq km of water), Namibia, 824,292 sq km (823,290 sq km of land and 1,002 km of water), Mozambique, 799,380 sq km (786,380 sq km of land and 13,000 sq km of water), Zambia, 752,618 sq km (743,398 sq km of land and 9,220 sq km of water), Morocco, 716,550 sq km (716,300 sq km of land and 250 sq km of water), South Sudan, 644,329 sq km (no data available for land and water), Central African Republic, 622,984 sq km (all land), Somalia, 637,657 sq km (627,337 sq km of land and 10,320 sq km of water), Madagascar, 587,041 sq km (581,540 sq km of land and 5,501 sq km of water), Botswana, 581,730 sq km (566,730 sq km of land and 15,000 sq km of water), and Kenya, 580,367 sq km (569,140 sq km of land and 11,227 sq km of water) (Tables A1 to A6).

The following nations in Africa have areas ranging from below 500,000 sq km to above 100,000 sq km: Cameroon, 475,440 sq km (472,710 sq km of land and 2,730 sq km of water), Zimbabwe, 390,757 sq km (386,847 sq km of land and 3,910 sq km of water), Republic of Congo, 342,000 sq km (341,500 sq km of land and 500 sq km of water), Cote D'Ivoire, 322,463 sq km (318,003 sq km of land and 4,460 sq km of water), Burkina Faso, 274,200 sq km (273,800 sq km of land and 400 sq km of water), Gabon, 267,667 sq km (257,667 sq km of land and 10,000 sq km of water), Guinea, 245,857 sq km (245,717 sq km of land and 140 sq km of water), Uganda, 241,038 sq km (197,100 sq km of land and 43,938 sq km of water), Ghana, 238,533 sq km (227,533 sq km of land and 11,000 sq km of water), Senegal, 196,722 sq km (192,530 sq km of land and 4,192 sq km of water), Tunisia, 163,610 sq km (155,360 sq km of land and 8,250 sq km of water), Malawi, 118,484 sq km (94,080 sq km of land and 24,404 sq km of water), Benin, 112,622 sq km (110,622 sq km of land and 2,000 sq km of water), Liberia, 111,369 sq km (96,320 sq km of land and 15,049 sq km of water), Eritrea, 101,000 sq km (16,600 sq km of land and 853 sq km of water) (Tables A1 to A6).

The following nations in Africa have areas below 100,000 sq km: Sierra Leone, 71,740 sq km (71,620 sq km of land and 120 sq km of water), Togo, 56,785 sq km (54,385 sq km of land and 2,400 sq km of water), Guinea-Bissau, 36,125 sq km (28,120 sq km of land and 8,005 sq km of water), Lesotho, 30,355 sq km (all land), Equatorial Guinea, 28,051 sq km (all land), Burundi, 27,830 sq km (25,680 sq km of land and 2,150 sq km of water), Rwanda, 26,338 sq km (24,668 sq km of land and 1,670 sq km of water), Djibouti, 23,200 sq km (23,180 sq km of land and 20 sq km of water), Eswatini, 17,364 sq km (17,204 sq km of land and 160 sq km of water), Gambia, 11,300 sq km (10,120 sq km of land and 1,180 sq km of water), Cabo Verde, 4,033 sq km (all land), Reunion, 2,517 sq km (2,507 sq km of land and 10 sq km of water), Comoros, 2,235 sq km (all land), Mauritius, 2,040 sq km (2,030 sq km of land and 10 sq km of water), Sao Tomi and Principe, 964 sq km (all land), Seychelles, 455 sq km (all land), Saint Helena, 394 sq km (all land), and Mayotte, 374 sq km (all land) (Tables A1 to A6) (Tables A1 to A6).

3.3 Average Elevation from Sea Level of African Countries

As discussed above, countries or regions with relatively higher elevation tend to have temperate or cool climates. Countries in Southern Africa, Eastern Africa, and Northern Africa, have relatively high average elevation. There are 16 countries in Africa with an average elevation ranging from over 1,000 meters to over 3,000 meters: South Sudan (3,362 meters), Lesotho (2,161 meters), Sao Tome & Principe (2,024 meters), Rwanda (1,598 meters), Reunion (1,535 meters), Burundi (1,504 meters), Cabo Verde (1,415 meters), Ethiopia (1,330 meters), Comoros (1,180 meters), Namibia (1141 meters), Zambia (1,138 meters), Angola (1,112 meters), Uganda (1,100 meters), South Africa (1,034 meters), Tanzania (1,018 meters), and Botswana (1,013 meters).

The following 12 countries have average elevation ranging from over 500 meters to below 1,000 meters: Zimbabwe (961 meters), Morocco (909 meters), Eritrea (853 meters), Algeria (800 meters), Malawi (779 meters), Kenya (762 meters), Cameroon (667 meters), Central African Republic (635 meters), Madagascar (615 meters), Equatorial Guinea (577 meters), Sudan (568 meters), and Chad (543 meters) (Tables A1 to A6).

The following 25 countries/entities have average elevation ranging from over 100 meters to below 500 meters: Niger (474 meters), Guinea (472 meters), Seychelles (453 meters), Republic of Congo (430 meters), Djibouti (430 meters), Libya (423 meters), Mauritius (414 meters), Somalia (410 meters), Nigeria (380 meters), Gabon (377 meters), Mozambique (345 meters), Mali (343 meters), Mayotte (330 meters), Egypt (321 meters), Eswatini (305 meters), Burkina Faso (297 meters), Sierra Leone (279 meters), Mauritania (276 meters), Benin (273 meters), Western Sahara (256 meters), Cote d'Ivoire (250 meters), Tunisia (246 meters), Liberia (243 meters), Togo (236 meters), and Ghana (190 meters). Finally, there are three countries with average elevation under 100 meters: Guinea-Bissau, (70 meters), Senegal (69 meters), and The Gambia (34 meters) (Table A1).

3.4 Highest Elevation Points in African Countries

According to Table A1, the following 17 African nations have highest elevation points of 3,000 meters or higher: Tanzania, 5,895 meters (Kilimanjaro, the highest point in Africa), Kenya, 5,199 meters (Mount Kenya), Democratic Republic of Congo, 5,110 meters (Pic Marguerite on Mont Ngaliema; Mount Stanley), Uganda, 5,110 meters (Margherita Peak on Mount Stanley), Ethiopia, 4,550 meters (Ras Dejen), Rwanda, 4,519 meters (Volcan Karisimbi), Morocco, 4,165 meters (Jebel Toubkal), Cameroon, 4,045 meters (Fako on Mont Cameroun), Lesotho, 3,482 meters (Thabana Ntlenyana), South Africa, 3,450 meters (Ntheledi (Mafadi)), Chad, 3,445 meters (Emi Koussi), South Sudan, 3,187 meters (Kinyeti), Reunion, 3,069 meters (Piton des Neiges), Sudan, 3,042 meters (Jabal Marrah), Eritrea, 3,018 meters (Soira), Equatorial Guinea, 3,008 meters (Pico Basile), Malawi, 3,002 meters (Sapitwa (Mount Mlanje)).

The following 17 African nations have highest elevation points from 2,000 meters to under 3,000 meters: Algeria, 2,908 meters (that), Madagascar, 2,876 meters (Maromokotro), Cabo Verde, 2,829 meters (Mt. Fogo (a volcano on Fogo Island)), Burundi, 2,685 meters (Mukike Range), Egypt, 2,629 meters (Mount Catherine), Angola, 2,620 meters (Moca), Zimbabwe, 2,592 meters (Inyangani), Namibia, 2,573 meters (Konigstein on Brandberg), Somalia, 2,460 meters (Mount Shimbiris), Mozambique, 2,436 meters (Monte Binga), Nigeria, 2,419 meters (Chappal Waddi), Comoros, 2,360 meters (Karthala), Zambia, 2,330 meters (Mafinga Central), Libya, 2,267 meters (Bikku Bitti), Sao Tome & Principe, 2,024 meters (Pico de Sao Tome), Niger, 2,022 (Idoukal-n-Taghes), and Djibouti, 2,021 meters (Moussa Ali).

The following 11 African nations have highest elevation points of 1,000 meters to less than 2,000 meters: Sierra Leone, 1,948 meters (Loma Mansa; Bintimani), Eswatini, 1,862 meters (Emlembe), Cote D'Ivoire 1,752 meters (Monts Nimba), Guinea, 1,752 meters (Mont Nimba), Tunisia, 1,544 meters (Jebel ech Chambì), Botswana, 1,495 meters (Manyelanong Hill), Liberia, 1,447 meters (Mount Wuteve), Central African Republic, 1,410 meters (Mont Ngaoui), Mali, 1,155 meters (Hombori Tondo), Gabon, 1,050 meters (Mont Bengoue), and Republic of Congo, 1,020 meters (Mont Nabeba). The following 13 African nations have highest elevation points below 1,000 meters: Togo, 986 meters (Mont Agou), Mauritania, 915 meters (Kediet Ijill), Seychelles, 905 meters (Morne Seychellois), Ghana, 885 meters (Mount Afadjato), Mauritius, 828 meters (Mont Piton), Saint Helena, 818 meters (Diana's Peak), Burkina Faso, 749 meters (Tena Kourou), Benin, 675 meters (unnamed elevation/ Kotopounga), Mayotte, 660 meters (Benara), Senegal, 648 meters (unnamed elevation/ southeast of Nepen Diaka), Western Sahara, 463 meters (unnamed location), Guinea Bissau, 277 meters (Dongol Ronde), and Gambia, 63 meters (unnamed elevation/ 3 km southeast of the town of Sabi). (Tables A1 to A6).

3.5 Lowest Elevation Points in African Countries

The data for the lowest elevation points in African nations show that two of the regions with countries that have the highest elevation points in Africa also have the lowest points: Eastern Africa and Northern Africa. Eastern Africa also has many countries with the highest lowest points in Africa. The following African countries have the highest lowest points on the continent: Lesotho, 1,400 meters (junction of the Orange and Makhaleng Rivers), Rwanda, 950 meters (Rusizi River), Burundi, 772 meters (Lake Tanganyika), Uganda, 614 meters (Albert Nile), Botswana, 513 meters (junction of the Limpopo and Shashe Rivers), South Sudan, 381 meters (White Nile), Central African Republic, 335 meters (Oubangui River), Zambia, 329 meters (Zambezi river), Burkina Faso, 200 meters (Mouhoun (Black Volta) River), Niger, 200 meters (Niger River), Zimbabwe, 162 meters (junction of the Runde and Save Rivers), Chad, 160 meters (Djourab), Malawi, 37 meters (junction of the Shire River and international boundary with Mozambique), Mali, 23 meters (Senegal River), and Eswatini, 21 meters (Great Usutu River).

The following countries have lowest elevation points of zero: Comoros, Kenya, Madagascar, Mauritius, Mayotte, Mozambique, Reunion, Seychelles, Somalia, and Tanzania, all at the Indian Ocean; Angola, Cameroon, Democratic Republic of Congo, Republic of Congo, Equatorial Guinea, Gabon, Sao Tome & Principe, Namibia, South Africa, Benin, Cabo Verde, Cote D'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Senegal, Sierra Leone, Togo, and Saint Helena, all at the Atlantic Ocean; and Sudan (Red Sea). The following nations have the lowest points in Africa: Djibouti, -155 meters (Lac Assal), Egypt, -133 meters (Qattara Depression), Ethiopia, -125 meters (Danakil Depression), Eritrea, -75 meters (near Kulul, Danakil Depression), Morocco, -59 meters (Sebkha Tah), Western Sahara, -55 meters (Sebjet Tah), Libya, -47 meters (Sabkhat Ghuzayyil), Algeria, -40 meters (Chott Melhrir), Tunisia, -17 meters (Shatt al Gharsah), and Mauritania, -5 meters (Sebkhet Te-n-Dghamcha) (Tables A1 to A6).

3.6 African Countries with Coastlines

African nations combined have tens of thousands of kilometers of coastlines, from the Atlantic Ocean to the Indian Ocean, to the Mediterranean Sea, and to the Red Sea. Eastern African countries combined have the highest number of coastlines, followed by Northern Africa, and Western Africa. According to Tables A1 to A6, of Africa's total coastline of 40,188 km, Eastern Africa accounted for 15,931 km (39.64%), Northern Africa, 10,164 km (25.3%), Western Africa, 6,125 km (15.24%), Southern Africa, 4,370 km (10.9%), and Middle Africa, 3,598 km (8.95%). Note that the coastline of 1,110 km for Western Sahara is not included in the Africa and North Africa totals, because it is part of Morocco.

Of the 40 nations/entities in Africa with coastlines, Madagascar has the longest, 4,828 km (12% of total coastline), followed by Somalia, 3,025 km (7.5%), Morocco, 2,945 km (7.33%), South Africa, 2,798 km (6.96%), Mozambique, 2,470 km (6.15%), Egypt, 2,450 km (6.1%), Eritrea, 2,234 km (5.6%), Libya, 1,770 km (4.4%), Angola, 1,600 km (3.98%), Namibia, 1,572 km (3.91%), Tanzania, 1,424 km (3.54%), Tunisia, 1,148 km (2.86%), Western Sahara, 1,110 km (2.76%), Algeria, 998 km (2.48%), Cabo Verde, 965 km (2.4%), Gabon, 885 km (2.2%), Nigeria, 853 km (2.12%), Sudan, 853 km (2.12%), Mauritania, 754 km (1.88%), Liberia, 579 km (1.44%), Ghana, 539 km (1.34%), Kenya, 536 km (1.33%), Senegal, 531 km (1.32%), Cote D'Ivoire, 515 km (1.3%), Seychelles, 491 km (1.22%), Cameroon, 402 km (1%), Sierra Leone, 402 km (1%), Guinea-Bissau, 350 km (0.9%), Comoros, 340 km (0.85%), Guinea, 320 km (0.8%), Djibouti, 314 km (0.78%), Equatorial Guinea, 296 km (0.74%), Sao Tome & Principe, 209 km (0.52%), Reunion, 207 km (0.52%), Mayotte, 182.2 km (0.45%), Mauritius, 177 km (0.44%), Republic of Congo, 169 km (0.42%), Benin, 121 km (0.3%), Gambia, 80 km (0.2%), Sain Helena, 60 km (0.15%), Togo, 56 km (0.14%), Democratic Republic of Congo, 37 km (0.09%). The following 16 African countries are landlocked, therefore have zero coastline: Botswana, Burkina Faso, Burundi, Central African Republic, Chad, Eswatini, Ethiopia, Lesotho, Malawi, Mali, Niger, Rwanda, South Sudan, Uganda, Zambia, and Zimbabwe (Tables A1 to A6).

3.7 Change in Average Annual Temperatures in African Countries: 1921 and 2021

The data on the mean or average annual temperatures in African countries for 1921 and 2021 show that the temperatures increased for all those with available data between these two dates. In 1921, the country with the highest average annual temperature in Africa is Burkina Faso, 83.73 degrees, followed by Mali, 83.61 degrees, Senegal, 82.45 degrees, Mauritania, 82.29 degrees, Djibouti, 82.24 degrees, Benin, 81.63 degrees, Gambia, 81.43 degrees, Niger, 81.39 degrees, Ghana, 80.98 degrees, Guinea-Bissau, 80.94 degrees, Togo, 80.46 degrees, South Sudan, 80.35 degrees, Nigeria, 80.33 degrees, Chad, 80.31 degrees, Somalia, 80.31 degrees, Sudan, 80.22 degrees, Seychelles, 79.56 degrees, Cote D'Ivoire, 79.43 degrees, Sierra Leone, 78.67 degrees, Eritrea, 78.08 degrees, Guinea, 77.34 degrees, Liberia, 77.09 degrees, Central African Republic, 76.87 degrees, Gabon, 76.6 degrees, Cameroon, 76.03 degrees, Kenya, 75.9 degrees, Republic of Congo, 75.83 degrees, Equatorial Guinea, 75.76 degrees, Democratic Republic of Congo, 75.18 degrees, Sao Tome and Principe, 75 degrees, Mozambique, 74.61 degrees, Comoros, 73.47 degrees, Algeria, 72.99 degrees, Cabo Verde, 72.91 degrees, Ethiopia, 72.9 degrees, Mauritius, 72.82 degrees, Madagascar, 72.57 degrees, Uganda, 72.27 degrees, Tanzania, 72.07 degrees, Egypt, 71.82 degrees, Malawi, 71.8 degrees, Libya, 71.24 degrees, Zambia, 70.81 degrees, Angola, 70.38 degrees, Zimbabwe, 69.64 degrees, Botswana, 69.51 degrees, Burundi, 67.84 degrees, Namibia, 67.5 degrees, Tunisia, 66.38 degrees, Eswatini, 66.22 degrees, Rwanda, 65.41 degrees, South Africa, 61.97 degrees, and Lesotho, 51.06 degrees (Tables B1 to B6).

In 2021, the country with the highest average annual temperature in Africa is Burkina Faso, 86.02 degrees, followed by Mali, 85.6 degrees, Senegal, 85.33 degrees, Mauritania, 84.74 degrees, Gambia, 84.2 degrees, Guinea-Bissau, 83.77 degrees, Benin, 83.66 degrees, Djibouti, 83.23 degrees, Ghana, 82.94 degrees, Sudan, 82.71 degrees, Niger, 82.56 degrees, Togo, 82.49 degrees, South Sudan, 82.18 degrees, Chad, 81.9 degrees, Nigeria, 81.81 degrees,

Cote D'Ivoire, 81.27 degrees, Sierra Leone, 80.94 degrees, Seychelles, 80.73 degrees, Somalia, 80.38 degrees, Eritrea, 80.37 degrees, Guinea, 79.86 degrees, Liberia, 78.57 degrees, Central African Republic, 78.4 degrees, Gabon, 78.17 degrees, Kenya, 77.41 degrees, Republic of Congo, 77.41 degrees, Cameroon, 77.38 degrees, Equatorial Guinea, 77.14 degrees, Sao Tome & Principe, 76.46 degrees, Mozambique, 76.15 degrees, Democratic Republic of Congo, 76.03 degrees, Algeria, 75.07 degrees, Egypt, 74.98 degrees, Mauritius, 74.66 degrees, Comoros, 74.32 degrees, Cabo Verde, 74.21 degrees, Ethiopia, 74.03 degrees, Uganda, 73.8 degrees, Libya, 73.49 degrees, Tanzania, 73.4 degrees, Madagascar, 73.17 degrees, Malawi, 73.04 degrees, Zambia, 71.82 degrees, Zimbabwe, 71.34 degrees, Angola, 71.13 degrees, Botswana, 71.13 degrees, Tunisia, 70.39 degrees, Eswatini, 68.99 degrees, Burundi, 68.95 degrees, Namibia, 68.22 degrees, Rwanda, 66.58 degrees, South Africa, 64.51 degrees, and Lesotho, 54.09 degrees (Tables B1 to B6).

The African nation with the highest annual average temperature increase from 1921 to 2021 is Tunisia, 4.01 degrees, followed by Egypt, 3.16 degrees, Lesotho, 3.03 degrees, Senegal, 2.88 degrees, Guinea-Bissau, 2.83 degrees, Eswatini, 2.77 degrees, Gambia, 2.77 degrees, South Africa, 2.54 degrees, Guinea, 2.52 degrees, Sudan, 2.49 degrees, Mauritania, 2.45 degrees, Burkina Faso, 2.29 degrees, Eritrea, 2.29 degrees, Sierra Leone, 2.27 degrees, Libya, 2.25 degrees, Algeria, 2.08 degrees, Benin, 2.03 degrees, Togo, 2.03 degrees, Ghana, 1.96 degrees, Mali, 1.92 degrees, Cote D'Ivoire, 1.84 degrees, Mauritius, 1.84 degrees, South Sudan, 1.83 degrees, Zimbabwe, 1.7 degrees, Botswana, 1.62 degrees, Chad, 1.59 degrees, Republic of Congo, 1.58 degrees, Gabon, 1.57 degrees, Uganda, 1.53 degrees, Kenya, 1.51 degrees, Central African Republic, 1.5 degrees, Mozambique, 1.49 degrees, Liberia, 1.48 degrees, Nigeria, 1.48 degrees, Sao Tome & Principe, 1.46 degrees, Equatorial Guinea, 1.38 degrees, Cameroon, 1.35 degrees, Tanzania, 1.33 degrees, Cabo Verde, 1.3 degrees, Malawi, 1.24 degrees, Niger, 1.17 degrees, Rwanda, 1.17 degrees, Seychelles, 1.17 degrees, Ethiopia, 1.14 degrees, Burundi, 1.1 degrees, Zambia, 1.01 degrees, Djibouti, 0.99 degrees, Comoros, 0.85 degrees, Democratic republic of Congo, 0.85 degrees, Angola, 0.75 degrees, Namibia, 0.72 degrees, Madagascar, 0.6 degrees, and Somalia, 0.07 degrees (Tables B1 to B6).

3.8 Coldest and Hottest Temperatures in African Countries, Location, Month, and Year, from 1914-2023

The data on the coldest and hottest temperatures in nations across Africa show that due to its massive size, Africa can be argued to have the characteristics of a planet. The reason is that Africa, like the United States, tend to have the climates of almost all parts of the world. This means that a person can leave anywhere in the world and relocate to Africa and will be able to reside in a region of the continent with a similar climate to their home region. The available data on the coldest and hottest temperatures across countries in Africa show that among those with the coldest temperatures for different periods for each country or entity, in the past 109 years (ranging from 1914 to 2023) are spread across the continent, showing that the various parts of the continent have temperate climates, which is one key theme of this study. According to Collins (2011): "Some of the extreme temperature variations that have been experienced in Africa include a high of 57.8°C (136°F) at El Aziza, Libya, on 13 September 1922 and a low of -23.9°C (-11°F) at Ifrane, Morocco, on 11 February 1935" (p.3650).

3.9 Coldest Temperatures (Coldest Day) in African Nations from 1914 to 2023

According to Tables B1 to B6, as of November 2023, the coldest temperatures in the thirties or lower in Africa in the past 109 years were recorded in: Madagascar (1951 to April 2023), -10.48 degrees (Ranohira weather station, July 2017), followed by Algeria (1949 to April 2023), 7.6 degrees (Mecheria weather station, January 2005), South Africa (1949 to April 2023), 10.04 degrees (Bloemfontein weather station, July 2000), Namibia (1949 to March 2023), 22.46 degrees (Grootfontein weather station, August 2014), Libya (1949 to April 2023), 23.9 degrees (Gariat El Sharghia weather station, January 2019), Tunisia (1949 to April 2023), 24.08 degrees (Gafsa weather station, January 2005), Morocco (1949 to April 2023), 25.16 degrees (Oujda weather station, January 2019), Niger (1937 to April 2023), 27.5 degrees (Bilma weather station, January 2005), Mozambique (1949 to April 2023), 28.04 degrees (Maputo weather station, May 2007), Ethiopia (1914 to April 2023), 29.12 degrees (Jimma weather station, January 2019), Egypt (1949 to April 2023), 29.48 degrees (Siwa weather station, January 2019), Zimbabwe (1949 to September 2017), 29.3 degrees (Bulawayo weather station, June 2011), Botswana (1975 to September 2022), 32 degrees (Pandamatenga weather station, May 2013), Tanzania (1949 to April 2023), 32 degrees (Dodoma weather station, May 2021), Burkina Faso (1949 to April 2023), 32.18 degrees (Dedougou weather station, July 2008), Mali (1949 to April 2023), 33.62 degrees (Nara weather station, January 2012), Sudan (1949 to March 2023), 33.8 degrees (Karima weather station, February 2005), Senegal (1949 to April 2023), 34.52 degrees (Linguere weather station, January 2019), Republic of Congo (1949 to April 2023), 35.06 degrees (Impfondo weather station, November 2005), Mauritania (1949 to April 2023), 36.14 degrees (Ayoun el Atrouss weather station, September 2009), Kenya (1949 to April 2023), 37.04 degrees (Nairobi Jomo Kenyatta Airport weather station, July 2002), Ghana (1952 to April 2023), 37.22 degrees (Accra weather station, January 2020) (Tables B1 to B4).

The coldest temperatures in the forties or higher were recorded in: Cote D'Ivoire (1949 to April 2023), 40.46 degrees (Abidjan weather station, July 2018), Zambia (1949 to December 2023), 41.9 degrees (Mongu weather station, June 2010), Cameroon (1952 to April 2023), 42.8 degrees (Ngaoundere weather station, January 2001), Togo (1949 to April 2023), 42.62 degrees (Lome weather station, February 2019), Chad (1949 to February 2023), 44.6 degrees (Moundou weather station, January 2015), Democratic Republic of Congo (1947 to April 2023), 45.5 degrees (Lubumbashi Luano weather station, August 2010), Malawi (1948 to May 2015), 45.5 degrees (Bvumbwe weather station, May 2010), Central African Republic (1949 to April 2023), 48.2 degrees (Bria weather station, January 2003), Gabon (1949 to April 2023), 49.1 degrees (Mvengue weather station, April 2012), Nigeria (1952 to April 2023), 51.91 degrees (Yola weather station, November 2015), Benin (1949 to April 2023), 52.16 degrees (Kandi weather station, January 2008), South Sudan (1949 to May 2012), 52.7 degrees (Renk weather station, January 2002), Rwanda (1975 to November 2023), 53.96 degrees (Kigali weather station, June 2020), Mauritius (1954 to April 2023), 54.32 degrees (Seewoosagur Ramgoolam Airport weather station, September 2013), Guinea (1949 to October 2023), 57.74 degrees (Conakry weather station, July 2003), Angola (1949 to September 2022), 60.8 degrees (Luanda weather station, August 2013), Equatorial Guinea (2003 to April 2023), 62.6 degrees (Bata weather station, August 2015), and Cabo Verde (1963 to April 2023), 62.96 degrees (Mindelo Sao Vicente weather station, January 2016) (Tables B1 to B4).

3.10 Hottest Temperatures (Hottest Day) in African Countries Ranging from 1914 to 2023

Africa's climate is unique in that countries that have relatively cold temperatures during at least several months of the year, could also experience very hot temperatures during certain periods of the year. This phenomenon is observed in Tables B1 to B6. As of November 2023, the nations with the hottest temperatures of 115 degrees or higher in Africa in the past 109 years (ranging from 1914 to 2023) are as follows: Algeria, 124.34 degrees (Ouargla Airport weather station, July 2018), Senegal, 122.9 degrees (Dakar Yoff weather station, May 2002), Tunisia, 122.54 degrees (Kairouan weather station, August 2021), South Sudan, 122 degrees (Wau weather station, July 2000), Mali, 121.64 degrees (Kita weather station, April 2021), Niger, 121.64 degrees (Tillabery weather station, June 2019), Chad, 121.46 degrees (N'djamena weather station, March 2021), Morocco, 121.28 degrees (Marrakesch weather station, July 2012), Sudan, 121.28 degrees (Dongola weather station, June 2010), Madagascar, 120.92 degrees (Ranohira weather station, February 2020), Egypt, 120.2 degrees (Kharga weather station, June 2018), Libya, 119.3 degrees (Jalo weather station, June 2010), Mauritania, 118.76 degrees (Akjoujt weather station, July 2002), Burkina Faso, 117.5 degrees (Dori weather station, April 2016), Togo, 117.5 degrees (Sokode weather station, March 2017), Mozambique, 116.16 degrees (Massangena weather station, October 2019), Nigeria, 115.52 degrees (Yola weather station, April 2010) (Tables B1 to B6).

The nations with temperatures below 115 degrees are as follows: Central African Republic, 114.44 degrees (N'dele weather station, February 2010), Cote D'Ivoire, 114.26 degrees (Gagnoa weather station, July 2018), Zimbabwe, 114.08 degrees (Chiredzi weather station, November 2015), Namibia, 113.9 degrees (Gobabeb weather station, March 2013), Cameroon, 113.54 degrees (Garoua weather station, April 2021), South Africa, 113.54 degrees (Upington weather station, January 2016), Benin, 112.82 degrees (Kandi weather station, February 2013), Guinea, 109.76 degrees (Conakry weather station, July 2003), Tanzania, 109.4 degrees (Mtwara weather station, October 2019), Equatorial Guinea, 107.6 degrees (Malabo weather station, May 2021), Kenya, 106.88 degrees (Mandera weather station, April 2019), Zambia, 106.7 degrees (Mongu weather station, September 2015), Botswana, 106.52 degrees (Maun weather station, October 2011), Gabon, 105.44 degrees (Tschibanga weather station, September 2015), Republic of Congo, 103.82 degrees (Impfondo weather station, February 2005), Ghana, 103.1 degrees (Accra weather station, January 2021), Ethiopia, 102.2 degrees (Dire Dawa weather station, May 2003), Angola, 96.08 degrees (Luanda weather station, April 2016), Democratic Republic of Congo, 101.84 degrees (Tshikapa weather station, November 2011), Mauritius, 96.08 degrees (St. Brandon Raphael Island weather station, January 2020), Cabo Verde, 92.3 degrees (Mindelo Sao Vicente weather station, June 2017), Malawi, 88.16 degrees (Bvumbwe weather station, February 2010), and Rwanda, 87.98 degrees (Kigali weather station, March 2010) (Tables B1 to B6).

3.11 Most Humid City/Town in Every African Country in 2023

Tables B1 to B6 show the day when it was the most humid or muggy in a country, and the city or town where it happened in 2023. It is reported that a humidity figure of 60% or less is manageable. Above 60% it is uncomfortable. Although the city or town that holds the record for being the most humid in the world in 2023 is not in Africa, many of the highest-ranking cities or towns were in Africa.

According to Tables B1 to B6, in 2023, the country with the city or town that recorded the highest percent in humidity was Cote D'Ivoire, 92.5% (Jacqueville), followed by Ghana, 90.2% (Anloga), Benin, 90% (Grand Popo),

Chad, 89.7% (Mboursou Lere), Equatorial Guinea, 89.3% (Rio Campo), Togo, 88.8% (Aneho), Cameroon, 86.6% (Kribi), Senegal, 85.5% (Foundiougne), Djibouti, 85.1% (Obock), Nigeria, 83.6% (Sapele), Gabon, 83% (Port-Gentil), Eritrea, 81.6% (Assab), Liberia, 81.6% (RobertSport), Democratic Republic of Congo, 80.9% (Boende), Uganda, 79.7% (Kayunga). Rwanda, 78.5% (Rwamagana), Guinea-Bissau, 78.4% (Cacheu), Sudan, 77.9% (Al Qadarif), Gambia, 76.5% (Gunjur), Republic of Congo, 74.6% (Pointe-Noire), Zambia, 73.8% (Siavonga), Seychelles, 73.5% (Victoria), Sao Tome & Principe, 72.9% (Santo Antonio), Burundi, 72.8% (Rumonge), Comoros, 72.6% (Domoni), Zimbabwe, 72.6% (Kariba), Madagascar, 72.3% (Mahajanga), Sierra Leone, 70.5% (Bonthe), Central African Republic, 69.5% (Batangafo), Guinea, 69.4% (Conakry), Angola, 69.1% (Cabinda), South Sudan, 68.9% (Tonj), Mozambique, 68.4% (Pemba), Botswana, 67.7% (Kasane), Cabo Verde, 67.1% (Cidade Velha), Ethiopia, 66.8% (Gambela), Tanzania, 65.6% (Wete), Niger, 64.3% (Gaya), Burkina Faso, 63.5% (Pama), Namibia, 62.9% (Katima Mulilo), Mauritania, 60.9% (Selibaby), Kenya, 60.8% (Kilifi), Morocco, 58.2% (El Jadida), Mauritius, 56.4% (Cargados Carajos), Mali, 53.8% (Bafoulabe), Egypt, 52.7% (Izbat al Burj), Lesotho, 50.7% (Mafeteng), Malawi, 50.4% (Nkhotakota), Somalia, 50.2% (Kismayo), Tunisia, 45.5% (Chebba), Libya, 45% (Misrata), South Africa, 44.5% (Durban), Esawtini, 42.4% (Lavumisa), and Algeria, 38.9% (Bejaia) (Tables B1 to B6).

4. Discussion

The statistics in this study present numerous interrelated findings illustrating that many countries and regions across Africa experience temperate climates for significant periods during the year. The data on climate zone or location show that of the 58 countries/entities in Africa in this study, 44 (75.9%) are categorized under tropics, and 14 (24.1%) are categorized under equatorial tropics/subtropics, subtropical, subtropics and tropics, subtropical/desert, subtropics of the northern hemisphere and subtropics of the southern hemisphere. Of the five regions in Africa, all the countries of Middle Africa, and all 16 countries of Western Africa are categorized under tropics; and the entity of Saint Helena in Western Africa is categorized as equatorial tropics/subtropics. Of the six countries and one entity (Western Sahara) in Northern Africa, only Sudan is categorized under tropics; the remaining five countries and Western Sahara are categorized under subtropics and tropics, subtropical/desert, and subtropics of the northern hemisphere. Finally, all the countries in Southern Africa are categorized under equatorial tropics/subtropics, subtropical, and subtropics of the southern hemisphere (Tables A1 to A 6; also see Cole, 2008: 65).

The statistics in this study also show that while Africa as a geographic location is categorized as being in the Southern Hemisphere, many countries and regions across the continent are on higher altitudes above sea level, including even certain countries in Western Africa (with 12 countries with an average elevation of 236 meters or higher) which have more countries with average low elevation. African countries especially from Eastern, Southern, and Middle Africa, have some of the highest elevation points in the world. For example, of the Top 50 most prominent peaks on earth, 7 (14%) are in Africa: #4, Tanzania (Kilimanjaro), #23, Ethiopia (Ras Dejen), #28, Democratic Republic of Congo/Uganda (Ngaliema; Mount Stanley), #31, Cameroon, (Mount Cameroon), #32, Kenya (Mount Kenya), and #37 Morocco (Jebel Toubkal) (“World Top 50: 50 Most Prominent Peaks on Earth,” 2007).

It is useful to point out that some of the regions with countries/entities having the highest elevation, also tend to have the lowest points in Africa and the world, with negative figures. The countries are as follows: Algeria (-40 meters), Djibouti (-155 meters), Egypt, (-133 meters), Eritrea (-75 meters), Ethiopia (-125 meters), Libya (-47 degrees), Mauritania (-5 meters), Morocco (-59 degrees), Tunisia (-17 meters), and Western Sahara (-55 meters). It is useful to note that the figure for Lesotho’s lowest point (1,400 meters) is higher than the highest points of 15 nations in Africa. For comparative purposes, a careful observation of data on the lowest point of each state in the United States shows that 48 of the states have lowest points either by a lake, river/stream, gulf, or ocean. The two states with a lowest point that is not one of these mentioned above are California (Death Valley), and Louisiana (New Orleans) (“List of U.S. states by elevation facts for kids,” 2023).

The statistics in this study show that as one moves in the interior from an ocean of a country or region, the higher the elevation to the point whereby, on average, the 16 landlocked countries in Africa have higher elevation levels than those countries or regions by an ocean. For example, 8 of the 16 landlocked countries in Africa have average elevation of 1,000 meters or more: Botswana, Burundi, Ethiopia, Lesotho, Rwanda, South Sudan, Uganda, and Zambia. Zimbabwe at 961 meters. A careful observation of the elevation data for states in the United States finds that landlocked states have higher elevation (“List of U.S. states by elevation facts for kids,” 2023).

The statistics in this study also show that Africa is a massive geographic area, with 12 countries each with total area of 1 million sq km or higher: Algeria, Angola, Chad, Democratic Republic of Congo, Egypt, Ethiopia, Libya,

Mali, Mauritania, Niger, Sudan, and South Africa. Nigeria is the only other country in Africa with an area of 900,000 sq km or higher (923,768 sq km) (Tables A 1 to A6). Of Africa's total area of 30,319,532 sq km, 574,393 sq km (2% excluding South Sudan) is water, with Eastern Africa accounting for 211,210 (36.8% of 574,393 sq km).

An interesting observation is that nations and regions with the highest or highest average elevation from sea level (Eastern, Southern, and Northern Africa) experienced an increase in average annual temperatures from 1921 to 2021 of 1.5 degrees or more: Algeria, Botswana, Chad, Central African Republic, Egypt, Eritrea, Eswatini, Gabon, Kenya, Lesotho, Libya, Mauritius, Mozambique, Republic of Congo, South Sudan, South Africa, Sudan, Tunisia, Uganda, Zimbabwe. Sao Tome & Principe (at 1.46 degrees). For Western African countries, only 4 countries did not experience an increase in temperature of 1.5 degrees or more: Cabo Verde, 1.3 degrees, Liberia and Nigeria, 1.48 degrees each (almost 1.5 degrees), and Niger, 1.17 degrees (Tables B1 to B6). According to Wu et al. (2023): "Over the past 100 years, the global average temperature has risen by 0.3–0.6 °C and will be 1.8–4.0 °C higher than that of the past century by the end of the twenty-first century. Global warming has accelerated the hydrological cycle and poses a potential threat to the survival and development of terrestrial ecosystems and human beings (pp.1-2). Rahimi et al. (2020) claim that: "Climate change is happening and affects all aspects of agricultural systems and consequently food security in the future... This is especially true in West Africa (WA), a region which is highly vulnerable to climate change due to low adaptive capacity ... the average temperature in this region for the year 2100 is expected to increase by 2 to 6 °C... in the future, most human population in the Sahel and the Western Sahara Desert would be at risk of experiencing heat stress conditions" (p.666). Marx et al. (2021) point out that: "... the Arabic-speaking desert countries of the Gulf Region in the Middle East and the French-speaking parts of Africa are expected to suffer from heat waves beyond the limit of human survival" (pp.793-794).

A potential factor for the relatively high increase in temperatures from 1921 to 2021 for relatively developed countries in Africa such as South Africa and countries in northern Africa, might be their industrial development and urban centers. The figure of 3.03 degrees for Lesotho may also be influenced by South Africa since that nation is geographically located inside South Africa. For example, writing about significant warming of the developed regions of South Africa, Collins (2011) finds that: "The observed warming in South Africa occurs largely on parts of the southern and eastern coast. This is in agreement with ... [a scholar] studying the period 1940– 1989 using station data who noted that only the coastal stations of South Africa had significant increasing temperature trends" (p.3658).

For the humidity data of the most humid towns or cities in African nations, it is noted that a humidity figure of 60% or less is bearable. However, a humidity figure of over 60% can become unbearable. According to Willett (2020), "In the simplest terms, humidity is a measure of how much water there is suspended in the air." It is reported that:

"Relative humidity [RH] could be 100% on a day when the temperature is at 86°F (30°C) and also on a day with 14°F (-10°C). But the reality is that no matter what the RH is at such a low temperature, it's doubtful that you'll be sweating and the air will feel muggy. However, if the temperature is 86°F (30°C) and the RH is at 60%, it will likely feel humid when the dew point sits at 70°F (21°C)... indoor relative humidity (RH) should be kept below 60% — ideally between 30% and 50%" (Navarro, 2023).

The 12 nations in this study with cities or towns with humidity figures of 60% or less are as follows: Algeria, Egypt, Eswatini, Lesotho, Libya, Malawi, Mali, Mauritius, Morocco, Somalia, South Africa, and Tunisia. Kenya has a humidity figure at 60.8%, and Mauritania, 60.9% (Tables B1 to B6; also see Oluwole, 2023).

The hottest day temperature data in African countries/entities are available for only 40 of them. Of the 40 countries/entities, only 5 (12.5%) have hottest day figures below 100 degrees, ranging from 87.98 degrees (Kigali weather station, Rwanda in March 2010), to 96.08 degrees each (in St. Brandon Raphael Island weather station, Mauritius in January 2020; and Luanda weather station, Angola in April 2016). The remaining 35 (87.5%) countries/entities have hottest day figures ranging from 101.84 degrees (Tshikapa weather station, Democratic Republic of Congo in November 2011), to 124.34 degrees (Ouargla Airport weather station, Algeria in July 2018). For the hottest day data, 2010 and 2021 each appeared 6 times; 2019 appeared 4 times; and 2015, 2016, and 2018 each appeared 3 times. According to Kompas et al. (2018): "Since 1850, the Earth's surface has become successively warmer and especially so over the past three decades. From 1880 to 2012, global average temperature (calculated with a linear trend for combined land and ocean surface temperature) shows a warming of 0.85 [0.65–1.06]°C... Emissions grew more quickly between 2000 and 2010, and carbon dioxide (CO₂) levels have increased by almost 50% since 1990" (p.1154).

Finally, the coldest day temperature data in African countries/entities are available for only 40 of them. Of the 40 countries/entities, 22 (55%) have coldest day temperatures in the 30s or lower, ranging from -10.48 degrees

(Ranohira weather station, Madagascar in July 2017), to 37.22 degrees (Accra weather station, Ghana in January 2020), representing all five regions of Africa. There are 15 (37.5%) countries in Africa with coldest day temperatures of 32 degrees or less, ranging from -10.48 degrees (Ranohira weather station, Madagascar in July 2017), to 32.18 degrees (Dedougou weather station, Burkina Faso in July 2008), representing all five regions of Africa. For the coldest year data in African nations, 2019 appeared 6 times; 2005 appeared 5 times; and 2010, 2013, and 2015 each appeared 3 times. It is useful to note that the coldest day temperature (for example 32 degrees or less) happened for most of these nations with relatively high elevation areas: Ranohira, Madagascar, 2,372 ft; Jimma, Ethiopia, 5,640 ft; Bulawayo, Zimbabwe, 4,423 ft; Dodoma, Tanzania, 3,691 ft; Mecheria, Algeria, 3,642 ft; Siwa, Egypt, -49 ft; Gafsa, Tunisia, 968 ft; Pandamatenga, Botswana, 3,517 ft; Grootfontein, Namibia, 4,724 ft; Bloemfontein, South Africa, 4,580 ft; Dédougou, Burkina Faso, 991 ft; and Bilma, Niger, 1,168 ft (Compiled from “The Weather Year Round Anywhere on Earth,” 2024). The figure for Gariat El Sharghia, Libya, is 497 meters/1,631 ft (“Temperature records of the last 74 years,” 2023).

This study has illustrated that the continent of Africa has many important advantages as it relates to its current and future development. The continent has abundant land that can be utilized for agriculture to produce food to feed itself and not depend on the importation of food, which costs substantially more (Kaba, 2006a; Sackeyfio and Kaba, 2022). It also has the strategic minerals and related natural resources needed for its development whereby it does not have to go abroad for the natural resources needed for its development (Kaba, 2004, 2024:72). The continent has the human resources needed for its development – its people, with a very high proportion of prime working age (Kaba, 2020, 2024:72).

The African Union, which is now recognized as a full-fledged member of the Group of 20 (G-20) nations now has the ability, technical expertise, and resources to lead the way in the continent’s development. The African Union must work with the African diaspora (which is designated by the African Union as the sixth region of Africa), especially the 50 million Black population in the United States, who are now among the wealthiest, most educated, and politically powerful entities in the world. The painful history of slavery and colonialism are what have separated these two entities (Africa and the African diaspora), and each needs the other. These two entities must work together and the sooner they forge a stronger economic and social partnership the faster they can solve the interrelated problems they face (Kaba, 2006b, 2008, 2009ab, 2010abc, 2011abcdef, 2012ab, 2013ab, 2015, 2016, 2017; Kaba and Ward, 2009). The Black population in the United States is increasingly engaging with the continent of Africa, and one positive sign is that those returning or relocating partially or fully to Africa are spread across the continent, and they bring their expertise with them. Many are integrating themselves in societies across the continent, including intermarrying with native born Africans on the continent, especially as the marriage rates for Black women and Black men tend to be relatively low in the United States (Kaba, 2004, 2011g, 2012c, 2021). The African Union, the African diaspora in the United States, and the United States government must all work together to strengthen the Africa – U.S. partnership, including in trade, technology transfer, agriculture, and education. The United States must significantly increase the number of international students from Africa in its colleges and universities so that they can return to staff the African Union and regional organizations’ bureaucracy (Kaba, 2004, 2005, 2006c, 2009a, 2019; M’Cormack-Hale and Kaba, 2015).

5. Conclusion

This paper began by discussing the paradoxes of Africa, Africans in Africa, and the African diaspora. The geographic territory of Africa and Africans in Africa have the characteristics of the richest and poorest region or continent and people in the world, while people of African descent in the diaspora being among the wealthiest and most educated people in the world. Africa’s is reported to have extreme climates, but this study finds that the continent actually has countries and regions with indicators or characteristics of temperate climates.

The study finds that of the 58 countries/entities in Africa, 44 (75.9%) are categorized under tropics, and 14 (24.1%) are categorized under equatorial tropics/subtropics, subtropical, subtropics and tropics, subtropical/desert, subtropics of the northern hemisphere and subtropics of the southern hemisphere. The study finds that Africa’s 1,448 billion people in 2023, accounting for 18.14% of the world population of 7.979 billion, reside on a landmass of 30.32 million sq km, which is 20% of the world total landmass of 148.94 million sq km. The continent’s total coastline of 40,188 km is 11.3% of the total 356,000 km coastline of the world. Of Africa’s total population in 2023, Eastern Africa accounted for 32.3%; Western Africa, 30.5%; Northern Africa, 17.9%; Middle Africa, 14.7%; and Southern Africa, 4.6 percent.

There are 16 countries in Africa with an average elevation ranging from over 1,000 meters to over 3,000 meters, and 12 countries have average elevation ranging from over 500 meters to under 1,000 meters. On average, the 16 landlocked countries in Africa have higher elevation levels than those countries or regions by an ocean, including

8 (50%) with an average elevation of 1,000 meters or more.

There are 20 (34.5%) of 58 nations in Africa that experienced an increase in average annual temperature from 1921 to 2021 of 1.5 degrees or more. There are 12 countries in Africa in this study with average humidity figures of 60% or less.

The study recommends that the African union lead the way to prepare for the movement of people in Africa and the African diaspora to various parts of the continent. The study also recommends that the African Union must work together with the United States to ease the transition process for people in the African diaspora returning to Africa in utilizing their expertise and wealth for Africa's development.

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Appendixes

Table A 1. Population, Area (land and water), Climate Zone, Average Elevation from Sea Level, Highest Point (name), Lowest Point (name), and Coastline of African Countries, 2023

						Average	Highest		Lowest		
	2023	Area	Land	Water	Climate	Elev. SL	Point		Point		Coastline
Country	Population	Sq km	Sq km	Sq km	Zone	Meters	Meters	Name	Meters	Name	km

Burundi	13,162,952	27,830	25,680	2,150	Tropics	1,504	2,685	Mukike Range	772	Lake Tanganyika	0
Comoros	888,378	2,235	2,235	0	Tropics	1,180	2,360	Karhala	0	Indian Ocean	340
Djibouti	976,143	23,200	23,180	20	Tropics	430	2,021	Moussa Ali	-155	Lac Assal	314
Eritrea	6,274,796	117,600	101,000	16,600	Tropics	853	3,018	Soira	-75	near Kulul ,Danakil Depression	2,234
Ethiopia	116,462,712	1,104,300	1,096,570	7,730	Tropics	1,330	4,550	Ras Dejen	-125	Danakil Depression	0
Kenya	57,052,004	580,367	569,140	11,227	Tropics	762	5,199	Mount Kenya	0	Indian Ocean	536
Madagascar	28,812,195	587,041	581,540	5,501	Equatorial Tropics & Subtropics	615	2,876	Maromokotro	0	Indian Ocean	4,828
Malawi	21,279,597	118,484	94,080	24,404	Tropics	779	3,002	Sapitwa (Mount Mlanje)	37	junction of the Shire River and international boundary with Mozambique	0
Mauritius	1,309,448	2,040	2,030	10	Tropics	414	828	Mont Piton	0	Indian Ocean	177
Mayotte (2010)*	231,139	374	374	0	Tropics	330	660	Benara	0	Indian Ocean	185.2
Mozambique	32,513,805	799,380	786,380	13,000	Equatorial Tropics & Subtropics	345	2,436	Monte Binga	0	Indian Ocean	2,470
Reunion (2006)*	787,584	2,517	2,507	10	Tropics	1,535	3,069	Piton des Neiges	0	Indian Ocean	207
Rwanda	13,400,541	26,338	24,668	1,670	Tropics	1,598	4,519	Volcan Karisimbi	950	Rusizi River	0
Seychelles	97,617	455	455	0	Tropics	453	905	Morne Seychellois	0	Indian Ocean	491
Somalia	12,693,796	637,657	627,337	10,320	Tropics	410	2,460	Mount Shimbiris	0	Indian Ocean	3,025
South Sudan	12,118,379	644,329	..	..	Tropics	3,362	3,187	Kinyeti	381	White Nile	0
Tanzania	65,642,682	947,300	885,800	61,500	Tropics	1,018	5,895	Kilimanjaro (highest point in	0	Indian Ocean	1,424
Uganda	47,729,952	241,038	197,100	43,938	Tropics	1,100	5,110	Margherita Peak on Mount Stanley	614	Albert Nile	0
Zambia	20,216,029	752,618	743,398	9,220	Tropics	1,138	2,330	Mafinga Central	329	Zambezi river	0
Zimbabwe	15,418,674	390,757	386,847	3,910	Tropics	961	2,592	Inyangani	162	junction of the Runde and Save Rivers	0
Angola	35,981,281	1,246,700	1,246,700	0	Tropics	1,112	2,620	Moca	0	Atlantic Ocean	1,600
Cameroon	30,135,732	475,440	472,710	2,730	Tropics	667	4,045	Fako on Mont Cameroun	0	Atlantic Ocean	402
Central African Rep.	5,552,228	622,984	622,984	0	Tropics	635	1,410	Mont Ngaoui	335	Oubangui River	0
Chad	18,523,165	1,284,000	1,259,200	24,800	Tropics	543	3,445	Emi Koussi	160	Djourab	0
Congo (D.R.)	111,859,928	2,344,858	2,267,048	77,810	Tropics	726	5,110	Pic Marguerite on Mont Ngalema (Mount Stanley)	0	Atlantic Ocean	37
Congo, Rep.	5,677,493	342,000	341,500	500	Tropics	430	1,020	Mont Nabeba	0	Atlantic Ocean	169
Equatorial Guinea	1,737,695	28,051	28,051	0	Tropics	577	3,008	Pico Basile	0	Atlantic Ocean	296
Gabon	2,397,368	267,667	257,667	10,000	Tropics	377	1,050	Mont Bengoue	0	Atlantic Ocean	885
Sao Tome & Principe	220,372	964	964	0	Tropics	2,024	2,024	Pico de Sao Tome	0	Atlantic Ocean	209
Algeria	44,758,398	2,381,740	2,381,740	0	Subtropics & Tropics	800	2,908	Tahat	-40	Chott Melhrir	998
Egypt	109,546,720	1,001,450	995,450	6,000	subtropical/Desert	321	2,629	Mount Catherine	-133	Qattara Depression	2,450
Libya	7,252,573	1,759,540	1,759,540	0	Subtropics of the Northern Hemisphere	423	2,267	Bikku Biti	-47	Sabkhat Ghuzayyil	1,770
Morocco	37,067,420	716,550	716,300	250	Subtropical/Desert	909	4,165	Jebel Toubkal	-59	Sebkha Tah	2,945
Sudan	49,197,555	1,861,484	1,731,671	129,813	Tropics	568	3,042	Jabal Marrah	0	Red Sea	853
Tunisia	11,976,182	163,610	155,360	8,250	Subtropics of the Northern Hemisphere	246	1,544	Jebel ech Chambi	-17	Shatt al Gharsah	1,148
Western* Sahara	652,271	266,000*	266,000*	0	Subtropics of the Northern Hemisphere	256	463	unnamed location	-55	Sebjet Tah	1,110
Botswana	2,417,596	581,730	566,730	15,000	Equatorial Tropics/Subtropics	1,013	1,495	Manyelanong Hill	513	junction of the Limpopo and Shashe Rivers	0
Eswatini	1,130,043	17,364	17,204	160	Subtropical	305	1,862	Emlembe	21	Great Usutu River	0
Lesotho	2,210,646	30,355	30,355	0	Sub-tropics of the Southern Hemisphere	2,161	3,482	Thabana Ntlenyana	1,400	junction of the Orange and Makhaleng Rivers	0
Namibia	2,777,232	824,292	823,290	1,002	Equatorial Tropics/Subtropics	1,141	2,573	Konigstein on Brandberg	0	Atlantic Ocean	1,572
South Africa	58,048,332	1,219,090	1,214,470	4,620	Subtropical	1,034	3,450	Ntheledi (Mafadi)	0	Atlantic Ocean	2,798
Benin	14,219,908	112,622	110,622	2,000	Tropics	273	675	unnamed elevation/ Kotopounga	0	Atlantic Ocean	121

Burkina Faso	22,489,126	274,200	273,800	400	Tropics	297	749	Tena Kourou	200	Mouhoun (Black Volta) River	0
Cabo Verde	603,901	4,033	4,033	0	Tropics	1,415	2,829	Mt. Fogo (a volcano on Fogo Island)	0	Atlantic Ocean	965
Cote d'Ivoire	29,344,847	322,463	318,003	4,460	Tropics	250	1,752	Monts Nimba	0	Gulf of Guinea	515
Gambia	2,468,569	11,300	10,120	1,180	Tropics	34	63	unnamed elevation/ 3 km southeast of the town of Sabi	0	Atlantic Ocean	80
Ghana	33,846,114	238,533	227,533	11,000	Tropics	190	885	Mount Afadjato	0	Atlantic Ocean	539
Guinea	13,607,249	245,857	245,717	140	Tropics	472	1,752	Mont Nimba	0	Atlantic Ocean	320
Guinea-Bissau	2,078,820	36,125	28,120	8,005	Tropics	70	277	Dongol Ronde	0	Atlantic Ocean	350
Liberia	5,506,280	111,369	96,320	15,049	Tropics	243	1,447	Mount Wuteve	0	Atlantic Ocean	579
Mali	21,359,722	1,240,192	1,220,190	20,002	Tropics	343	1,155	Hombori Tondo	23	Senegal River	0
Mauritania	4,244,878	1,030,700	1,030,700	0	Tropics	276	915	Kediet Ijill	-5	Sebkhet Te-n-Dghamcha	754
Niger	25,396,840	1,267,000	1,266,700	300	Tropics	474	2,022	Idoukal-n-Taghes	200	Niger River	0
Nigeria	230,842,743	923,768	910,768	13,000	Tropics	380	2,419	Chappal Waddi	0	Atlantic Ocean	853
Senegal	18,384,660	196,722	192,530	4,192	Tropics	69	648	unnamed elevation/ southeast of Nepen Diaka	0	Atlantic Ocean	531
Sierra Leone	8,908,040	71,740	71,620	120	Tropics	279	1,948	Loma Mansa (Bintimani)	0	Atlantic Ocean	402
Togo	8,703,961	56,785	54,385	2,400	Tropics	236	986	Mont Agou	0	Atlantic Ocean	56
Saint Helena	7,935	394	394	0	Equatorial Tropics/Subtropics	..	818	Diana's Peak	0	Atlantic Ocean	60
Total	1,447,549,975	30,319,532	29,100,810	574,393							40,188.2

Source: see methodology section.

Note: Population total does not include Western Sahara; Population data for Western Sahara from (Kaba, 2020: 250-252);

other variables from the 2004 CIA World Factbook

(<https://user.iiasa.ac.at/~marek/fbook/04/print/wi.html>); land and water data not available for South Sudan; Population data for

Mayotte as of 2010 (Kaba, 2020: 250-252),

and all the other variables are from the 2004 CIA World

Factbook (<https://user.iiasa.ac.at/~marek/fbook/04/print/mf.html>)

, and; Population data for Reunion as of 2006 (Kaba, 2020; 250-252), and all the other variables from the 2004 CIA World Factbook

(<https://user.iiasa.ac.at/~marek>

/fbook/04/geos/re.html); average elevation from sea level for the following Uganda is from: <https://www.worldatlas.com/maps/uganda>;

and for the following

countries/entities Comoros, Mauritius, Reunion, Sao Tome & Principe, Seychelles, South Sudan, and Western Sahara are from Confiduss Solutions (<https://www.confiduss.com/en/>);<https://www.confiduss.com/en/jurisdictions/comoros/geography/#:~:text=Comoros%20is%20Moroni,-Elevation,oP%20Comoros%20is%20Indian%20Ocean>.

<https://www.confiduss.com/en/jurisdictions/mauritius/geography/#:~:text=is%20Port%20Louis,-Elevation,oP%20Mauritius%20is%20Indian%20Ocean>.

<https://www.confiduss.com/en/jurisdictions/reunion-island/geography/#:~:text=Elevation-,The%20average%20elevation%20range%20of%20Reunion%20Island%20is%201%20C535%20m,Reunion%20Island%20is%20Indian%20Ocean>;

<https://www.confiduss.com/en/jurisdictions/seychelles/geography/>.

<https://www.confiduss.com/en/jurisdictions/sao-tome-and-principe/geography/>

<https://www.confiduss.com/en/jurisdictions/western-sahara/geography/>;

<https://www.confiduss.com/en/jurisdictions/south-sudan/geography/>;

<https://www.confiduss.com/en/jurisdictions/south-sudan/geography/#:~:text=Elevation-,The%20average%20elevation%20range%20of%20Western%20Sahara%20is%20256%20m,i.e.%20below%20the%20sea%20level>.

<https://www.confiduss.com/en/jurisdictions/south-sudan/geography/#:~:text=Elevation-,The%20average%20elevation%20range%20of%20Western%20Sahara%20is%20256%20m,i.e.%20below%20the%20sea%20level>.

<https://www.confiduss.com/en/jurisdictions/south-sudan/geography/#:~:text=Elevation-,The%20average%20elevation%20range%20of%20Western%20Sahara%20is%20256%20m,i.e.%20below%20the%20sea%20level>.

<https://www.confiduss.com/en/jurisdictions/south-sudan/geography/#:~:text=Elevation-,The%20average%20elevation%20range%20of%20Western%20Sahara%20is%20256%20m,i.e.%20below%20the%20sea%20level>.

It is useful to note that the 2004 CIA World Factbook's data for Morocco did not include Western Sahara, and listed a total population of 32,209,101; area of 446,550 sq km (446,300 sq km of land and 250 sq km or water); and a coastline of 1,835 km (<https://user.iiasa.ac.at/~marek/fbook/04/print/mo.html>).

Table A 2. Population, Area (land and water), Climate Zone, Average Elevation from Sea Level, Highest Point (name), Lowest Point (name), and Coastline of Eastern African Countries, 2023

	2023	Area	Land	Water	Climate	Average	Highest		Lowest		
Country	Population	Sq km	Sq km	Sq km	Zone	Elev. SL	Point	Name	Point	Name	Coastline
						Meters	Meters		Meters		km
Burundi	13,162,952	27,830	25,680	2,150	Tropics	1,504	2,685	Mukike Range	772	Lake Tanganyika	0
Comoros	888,378	2,235	2,235	0	Tropics	1,180	2,360	Karthala	0	Indian Ocean	340
Djibouti	976,143	23,200	23,180	20	Tropics	430	2,021	Moussa Ali	-155	Lac Assal	314
Eritrea	6,274,796	117,600	101,000	16,600	Tropics	853	3,018	Soira	-75	near Kulul ,Danakil Depression	2,234
Ethiopia	116,462,712	1,104,300	1,096,570	7,730	Tropics	1,330	4,550	Ras Dejen	-125	Danakil Depression	0
Kenya	57,052,004	580,367	569,140	11,227	Tropics	762	5,199	Mount Kenya	0	Indian Ocean	536
Madagascar	28,812,195	587,041	581,540	5,501	equatorial tropics & subtropics	615	2,876	Maromokotro	0	Indian Ocean	4,828
Malawi	21,279,597	118,484	94,080	24,404	Tropics	779	3,002	Sapitwa (Mount Mlanje)	37	junction of the Shire River and international boundary with Mozambique	0
Mauritius	1,309,448	2,040	2,030	10	Tropics	414	828	Mont Piton	0	Indian Ocean	177
Mayotte (2010)	231,139	374	374	0	Tropics	330	660	Benara	0	Indian Ocean	185.2
Mozambique	32,513,805	799,380	786,380	13,000	equatorial tropics & subtropics	345	2,436	Monte Binga	0	Indian Ocean	2,470
Reunion (2006)	787,584	2,517	2,507	10	Tropics	1,535	3,069	Piton des Neiges	0	Indian Ocean	207
Rwanda	13,400,541	26,338	24,668	1,670	Tropics	1,598	4,519	Volcan Karisimbi	950	Rusizi River	0
Seychelles	97,617	455	455	0	Tropics	453	905	Morne Seychellois	0	Indian Ocean	491
Somalia	12,693,796	637,657	627,337	10,320	Tropics	410	2,460	Mount Shimbiris	0	Indian Ocean	3,025
South Sudan	12,118,379	644,329	..	..	Tropics	3,362	3,187	Kinyeti	381	White Nile	0
Tanzania	65,642,682	947,300	885,800	61,500	Tropics	1,018	5,895	Kilimanjaro (highest point in	0	Indian Ocean	1,424
Uganda	47,729,952	241,038	197,100	43,938	Tropics	1,100	5,110	Margherita Peak on Mount Stanley	614	Albert Nile	0
Zambia	20,216,029	752,618	743,398	9,220	Tropics	1,138	2,330	Mafinga Central	329	Zambezi river	0
Zimbabwe	15,418,674	390,757	386,847	3,910	Tropics	961	2,592	Inyangani	162	junction of the Runde and Save Rivers	0
Total	467,068,423	7,005,860	6,150,321	211,210							15,931.2

Source: see methodology section.

Note: Land and water data not available for South Sudan; Population data for Mayotte as of 2010 (Kaba, 2020: 250-252), and all the other variables are from the 2004 CIA World

Factbook (<https://user.iiasa.ac.at/~marek/fbook/04/print/mf.html>);

Population data for Reunion as of 2006 (Kaba, 2020; 250-252), and all the other variables from the 2004 CIA World Factbook (<https://user.iiasa.ac.at/~marek>

[/fbook/04/geos/re.html](https://user.iiasa.ac.at/~marek/fbook/04/geos/re.html)); average elevation from sea level for the following Uganda is from: <https://www.worldatlas.com/maps/uganda>;

and for the following countries/entities Cabo Verde, Comoros, Mauritius, Reunion, Seychelles, South Sudan, and Western Sahara are from Confiduss Solutions:

(<https://www.confiduss.com/en/>);<https://www.confiduss.com/en/jurisdictions/comoros/geography>

[/#:~:text=Comoros%20is%20Moroni,-Elevation,of%20Comoros%20is%20Indian%20Ocean](https://www.confiduss.com/en/jurisdictions/comoros/geography/#:~:text=Comoros%20is%20Moroni,-Elevation,of%20Comoros%20is%20Indian%20Ocean).

<https://www.confiduss.com/en/jurisdictions/mauritius/geography/#:~:text=is%20Port%20Louis,-Elevation,of%20Mauritius%20is%20Indian%20Ocean>.

<https://www.confiduss.com/en/jurisdictions/reunion-island/geography/#:~:text=Elevation,-The%20average%20elevation%20range%20of%20Reunion%20Island%20is%201%2C535%20m,Reunion%20Island%20is%20Indian%20Ocean>;

<https://www.confiduss.com/en/jurisdictions/seychelles/geography/>.

Table A 3. Population, Area (land and water), Climate Zone, Average Elevation from Sea Level, Highest Point (name), Lowest Point (name), and Coastline of Middle African Countries, 2023

						Average	Highest			Lowest	
	2023	Area	Land	Water	Climate	Elev. SL	Point			Point	Coastline
Country	Population	Sq km	Sq km	Sq km	Zone	Meters	Meters	Name	Meters	Name	km
Angola	35,981,281	1,246,700	1,246,700	0	Tropics	1,112	2,620	Moca	0	Atlantic Ocean	1,600
Cameroon	30,135,732	475,440	472,710	2,730	Tropics	667	4,045	Fako on Mont Cameroun	0	Atlantic Ocean	402
Central African Rep.	5,552,228	622,984	622,984	0	Tropics	635	1,410	Mont Ngaoui	335	Oubangui River	0
Chad	18,523,165	1,284,000	1,259,200	24,800	Tropics	543	3,445	Emi Koussi	160	Djourab	0
Congo, Rep.	111,859,928	2,344,858	2,267,048	77,810	Tropics	726	5,110	Pic Marguerite on Mont Ngaliema (Mount Stanley)	0	Atlantic Ocean	37
Congo (D.R.)	5,677,493	342,000	341,500	500	Tropics	430	1,020	Mont Nabeba	0	Atlantic Ocean	169
Equatorial Guinea	1,737,695	28,051	28,051	0	Tropics	577	3,008	Pico Basile	0	Atlantic Ocean	296
Gabon	2,397,368	267,667	257,667	10,000	Tropics	377	1,050	Mont Bengoue	0	Atlantic Ocean	885
Sao Tome & Principe	220,372	964	964	0	Tropics	2,024	2,024	Pico de Sao Tome	0	Atlantic Ocean	209
Total	212,085,262	6,612,664	6,496,824	115,840							3,598

Source: see methodology section.

Note: Data for average elevation from sea level for Sao Tome & Principe are from Confiduss Solutions:

<https://www.confiduss.com/en/jurisdictions/sao-tome-and-principe/geography/>

Table A 4. Population, Area (land and water), Climate Zone, Average Elevation from Sea Level, Highest Point (name), Lowest Point (name), and Coastline of African Northern Countries, 2023

						Average	Highest			Lowest	
	2023	Area	Land	Water	Climate	Elev. SL	Point			Point	Coastline
Country	Population	Sq km	Sq km	Sq km	Zone	Meters	Meters	Name	Meters	Name	km
Algeria	44,758,398	2,381,740	2,381,740	0	subtropics & tropics	800	2,908	Tahat	-40	Chott Melrhir	998
Egypt	109,546,720	1,001,450	995,450	6,000	subtropical/Desert	321	2,629	Mount Catherine	-133	Qattara Depression	2,450
Libya	7,252,573	1,759,540	1,759,540	0	Subtropics of the northern hemisphere	423	2,267	Bikku Biti	-47	Sabkhat Ghuzayyil	1,770
Morocco	37,067,420	716,550	716,300	250	subtropical/Desert	909	4,165	Jebel Toubkal	-59	Sebkhah Tah	2,945
Sudan	49,197,555	1,861,484	1,731,671	129,813	Tropics	568	3,042	Jabal Marrah	0	Red Sea	853
Tunisia	11,976,182	163,610	155,360	8,250	Subtropics of the northern hemisphere	246	1,544	Jebel ech Chambi	-17	Shatt al Gharsah	1,148
Western Sahara	652,271	266,000*	266,000*	0	Subtropics of the northern hemisphere	256	463	unnamed location	-55	Sebjet Tah	1,110
Total	259,798,848	7,884,374	7,740,061	144,313							10,164

Source: see methodology section.

Note: Population total does not include Western Sahara; Population data for Western Sahara from (Kaba, 2020: 250-252);

other variables from the 2004 CIA World Factbook

(<https://user.iiasa.ac.at/~marek/fbook/04/print/wi.html>); Data for average elevation from sea level for Western Sahara are from Confiduss Solutions:

<https://www.confiduss.com/en/jurisdictions/western-sahara/geography/>; It is useful to note that the 2004 CIA World Factbook's data for

Morocco did not include Western Sahara, and listed a total population of 32,209,101; area of 446,550 sq km (446,300 sq km of land

and 250 sq km of water); and a coastline of 1,835 km (<https://user.iiasa.ac.at/~marek/fbook/04/print/mo.html>)

Table A 5. Population, Area (land and water), Climate Zone, Average Elevation from Sea Level, Highest Point (name), Lowest Point (name), and Coastline of Southern African Countries, 2023

	2023	Area	Land	Water	Climate	Average	Highest		Lowest		
Country	population	Sq km	Sq km	Sq km	Zone	Elev. SL	Point	Name	Point	Name	Coastline
						Meters	Meters		Meters		km
Botswana	2,417,596	581,730	566,730	15,000	equatorial tropics/subtropics	1,013	1,495	Manyelanong Hill	513	junction of the Limpopo and Shashe Rivers	0
Swaziland	1,130,043	17,364	17,204	160	subtropical	305	1,862	Emlembe	21	Great Usutu River	0
Lesotho	2,210,646	30,355	30,355	0	sub-tropics of the southern hemisphere	2,161	3,482	Thabana Ntlenyana	1,400	junction of the Orange and Makhaleng Rivers	0
Namibia	2,777,232	824,292	823,290	1,002	equatorial tropics/subtropics	1,141	2,573	Konigstein on Brandberg	0	Atlantic Ocean	1,572
South Africa	58,048,332	1,219,090	1,214,470	4,620	subtropical	1,034	3,450	Ntheledi (Mafadi)	0	Atlantic Ocean	2,798
Total	66,583,849	2,672,831	2,652,049	20,782							4,370

Source: see methodology section.

Table A 6. Population, Area (land and water), Climate Zone, Average Elevation from Sea Level, Highest Point (name), Lowest Point (name), and Coastline of Western African Countries, 2023

	2023	Area	Land	Water	Climate	Average	Highest		Lowest		
Country	population	Sq km	Sq km	Sq km	Zone	Elev. SL	Point	Name	Point	Name	Coastline
						Meters	Meters		Meters		km
Benin	14,219,908	112,622	110,622	2,000	Tropics	273	675	unnamed elevation/ Kotopounga	0	Atlantic Ocean	121
Burkina Faso	22,489,126	274,200	273,800	400	Tropics	297	749	Tena Kourou	200	Mouhoun (Black Volta) River	0
Cape Verde	603,901	4,033	4,033	0	Tropics	1,415	2,829	Mt. Fogo (a volcano on Fogo Island)	0	Atlantic Ocean	965
Cote d'Ivoire	29,344,847	322,463	318,003	4,460	Tropics	250	1,752	Monts Nimba	0	Gulf of Guinea	515
Gambia	2,468,569	11,300	10,120	1,180	Tropics	34	63	unnamed elevation/ 3 km southeast of the town of Sabi	0	Atlantic Ocean	80
Ghana	33,846,114	238,533	227,533	11,000	Tropics	190	885	Mount Afadjato	0	Atlantic Ocean	539
Guinea	13,607,249	245,857	245,717	140	Tropics	472	1,752	Mont Nimba	0	Atlantic Ocean	320
Guinea-Bissau	2,078,820	36,125	28,120	8,005	Tropics	70	277	Dongol Ronde	0	Atlantic Ocean	350
Liberia	5,506,280	111,369	96,320	15,049	Tropics	243	1,447	Mount Wuteve	0	Atlantic Ocean	579
Mali	21,359,722	1,240,192	1,220,190	20,002	Tropics	343	1,155	Hombori Tondo	23	Senegal River	0
Mauritania	4,244,878	1,030,700	1,030,700	0	Tropics	276	915	Kediet Ijill	-5	Sebkhet Te-n-Dghamcha	754
Niger	25,396,840	1,267,000	1,266,700	300	Tropics	474	2,022	Idoukal-n-Taghes	200	Niger River	0
Nigeria	230,842,743	923,768	910,768	13,000	Tropics	380	2,419	Chappal Waddi	0	Atlantic Ocean	853
Senegal	18,384,660	196,722	192,530	4,192	Tropics	69	648	unnamed elevation/ southeast of Nepen Diaka	0	Atlantic Ocean	531
Sierra Leone	8,908,040	71,740	71,620	120	Tropics	279	1,948	Loma Mansa (Bintimani)	0	Atlantic Ocean	402
Togo	8,703,961	56,785	54,385	2,400	Tropics	236	986	Mont Agou	0	Atlantic Ocean	56
Saint Helena	7,935	394	394	0	equatorial tropics/subtropics	..	818	Diana's Peak	0	Atlantic Ocean	60
Total	442,013,593	6,143,803	6,061,555	82,248							6,125

Source: see methodology section.

Note: Data for average elevation from sea level for the Cabo Verde

are from Confiduss Solutions: <https://www.confiduss.com/en/jurisdictions/cape-verde/geography/>.

Table B 1. Average Annual Temperature, Number Change, and Coldest and Hottest Temperature, Location, and Date (Month and Year) of African Countries, 2023

	Ave. Annual					Coldest				Hottest			
	Temp.		Number	Humidity		Temp.		Date		Temp.		Date	
Country	1921	2021	Change	City/Town	%	Location	Temp.	Month	Year	Location	Temp.	Month	Year
Burundi	67.84	68.95	1.11	Rumonge	72.8	..	..	..	..	..	..	..	..
Comoros	73.47	74.32	0.85	Domoni	72.6	..	..	..	..	..	..	..	..
Djibouti	82.24	83.23	0.99	Obock	85.1	..	..	..	..	..	..	..	..
Eritrea	78.08	80.37	2.29	Assab	81.6	..	..	..	..	..	..	..	..
Ethiopia	72.9	74.03	1.14	Gambela	66.8	Jimma weather station	29.1	January	2019	Dire Dawa weather station	102.2	May	2003
Kenya	75.9	77.41	1.51	Kilifi	60.8	Nairobi Jomo Kenyatta Airport weather station	37	July	2002	Mandera weather station	106.9	April	2019
Madagascar	72.57	73.17	0.6	Mahajanga	72.3	Ranohira weather station	####	July	2017	Ranohira weather station	120.9	February	2020
Malawi	71.8	73.04	1.24	Nkhotakota	50.4	Bvumbwe weather station	45.5	May	2010	Bvumbwe weather station	88.16	February	2010
Mauritius	72.82	74.66	1.84	Cargados Carajos	56.4	Seewoosagur Ramgoolam Airport weather station	54.3	September	2013	St. Brandon Raphael Island weather station	96.08	January	2020
Mayotte (2010)	..	..	..	..	..	..	..	..	..	..	..	..	..
Mozambique	74.61	76.15	1.49	Pemba	68.4	Maputo weather station	28	May	2007	Massangena weather station	116.1	October	2019
Reunion (2006)	..	..	..	..	..	..	..	..	..	..	..	..	..
Rwanda	65.41	66.58	1.17	Rwamagana	78.5	Kigali weather station	54	June	2020	Kigali weather station	87.98	March	2010
Seychelles	79.56	80.73	1.17	Victoria	73.5	..	..	..	..	..	..	..	..
Somalia	80.31	80.38	0.07	Kismayo	50.2	..	..	..	..	..	..	..	..
South Sudan	80.35	82.18	1.83	Tonj	68.9	Renk weather station	52.7	January	2002	Wau weather station	122	July	2000
Tanzania	72.07	73.4	1.33	Wete	65.6	Dodoma weather station	32	May	2021	Mtwara weather station	109.4	October	2019
Uganda	72.27	73.8	1.53	Kayunga	79.7	..	..	..	..	..	..	..	..
Zambia	70.81	71.82	1.01	Siavonga	73.8	Mongu weather station	41.9	June	2010	Mongu weather station	106.7	September	2015
Zimbabwe	69.64	71.34	1.7	Kariba	72.6	Bulawayo weather station	29.3	June	2011	Chiredzi weather station	114.1	November	2015
Angola	70.38	71.13	0.75	Cabinda	69.1	Luanda weather station	60.8	August	2013	Luanda weather station	96.08	April	2016
Cameroon	76.03	77.38	1.35	Kribi	86.6	Ngaoundere weather station	42.8	January	2001	Garoua weather station	113.5	April	2021
Central African Rep.	76.87	78.4	1.53	Batangafo	69.5	Bria weather station	48.2	January	2003	N'dele weather station	114.4	February	2010
Chad	80.31	81.9	1.59	Mboursou Lere	89.7	Moundou weather station	44.6	January	2015	N'djamena weather station	121.5	March	2021
Congo (D.R.)	75.18	76.03	0.85	Boende	80.9	Lubumbashi Luano weather station	45.5	August	2010	Tshikapa weather station	101.8	November	2011
Congo, Rep.	75.83	77.41	1.58	Pointe-Noire	74.6	Impfondo weather station	35.1	November	2005	Impfondo weather station	103.8	February	2005
Equatorial Guinea	75.76	77.14	1.38	Rio Campo	89.3	Bata weather station	62.6	August	2015	Malabo weather station	107.6	May	2021
Gabon	76.6	78.17	1.57	Port-Gentil	83	Mvengue weather station	49.1	April	2012	Tschibanga weather station	105.4	september	2015
Sao Tome & Principe	75	76.46	1.46	Santo Antonio	72.9	..	..	..	..	..	..	..	..
Algeria	72.99	75.07	2.08	Bejaia	38.9	Mecheria weather station	7.16	January	2005	Ouargla Airport weather station	124.3	July	2018
Egypt	71.82	74.98	3.16	Izbat al Burj	52.7	Siwa weather station	29.5	January	2019	Kharga weather station	120.2	June	2018
Libya	71.24	73.49	2.25	Misrata	45	Gariat El Sharghia weather station	23.9	January	2019	Jalo weather station	119.3	June	2010
Morocco	..	..	..	El Jadida	58.2	Oujda weather station	25.2	January	2019	Marrakesch weather station	121.3	July	2012
Sudan	80.22	82.71	2.49	Al Qadarif	77.9	Karima weather station	33.8	February	2005	Dongola weather station	121.3	June	2010
Tunisia	66.38	70.39	4.01	Chebba	45.5	Gafsa weather station	24.1	January	2005	Kairouan weather station	122.5	August	2021
Western Sahara	..	..	..	..	..	..	..	..	..	..	..	..	..
Botswana	69.51	71.13	1.62	Kasane	67.7	Pandamatenga weather station	32	May	2013	Maun weather station	106.5	October	2011

Eswatini	66.22	68.99	2.77	Lavumisa	42.4				..		..		..
Lesotho	51.06	54.09	3.03	Mafeteng	50.7				..		..		..
Namibia	67.5	68.22	0.72	Katima Mulilo	62.9	Grootfontein weather station	22.5	August	2014	Gobabeb weather station	113.9	March	2013
South Africa	61.97	64.51	2.54	Durban	44.5	Bloemfontein weather station	10	July	2000	Upington weather station	113.5	January	2016
Benin	81.63	83.66	2.03	Grand Popo	90	Kandi weather station	52.2	January	2008	Kandi weather station	112.8	February	2013
Burkina Faso	83.73	86.02	2.29	Pama	63.5	Dedougou weather station	32.2	July	2008	Dori weather station	117.5	April	2016
Cabo Verde	72.91	74.21	1.3	Cidade Velha	67.1	Mindelo Sao Vicente weather station	63	January	2016	Mindelo Sao Vicente weather station	92.3	June	2017
Cote d'Ivoire	79.43	81.27	1.84	Jacqueville	92.5	Abidjan weather station	40.5	July	2018	Gagnoa weather station	114.3	July	2018
Gambia	81.43	84.2	2.77	Gunjur	76.5				..		..		..
Ghana	80.98	82.94	1.96	Anloga	90.2	Accra weather station	37.2	January	2020	Accra weather station	103.1	January	2021
Guinea	77.34	79.86	2.52	Conakry	69.4	Conakry weather station	57.7	July	2003	Conakry weather station	109.8	July	2003
Guinea-Bissau	80.94	83.77	2.83	Cacheu	78.4				..		..		..
Liberia	77.09	78.57	1.48	RobertSport	81.6				..		..		..
Mali	83.61	85.6	1.92	Bafoulabe	53.8	Nara weather station	33.6	January	2012	Kita weather station	121.6	April	2021
Mauritania	82.29	84.74	2.45	Selibaby	60.9	Ayoun el Atrouss weather station	36.1	September	2009	Akjoujt weather station	118.8	July	2002
Niger	81.39	82.56	1.17	Gaya	64.3	Bilma weather station	27.5	January	2005	Tillabery weather station.	121.6	June	2019
Nigeria	80.33	81.81	1.48	Sapele	83.6	Yola weather station	51.9	November	2015	Yola weather station	#####	April	2010
Senegal	82.45	85.33	2.88	Foundiougne	85.6	Linguere weather station	34.52	January	2019	Dakar Yoff weather station	122.9	May	2002
Sierra Leone	78.67	80.94	2.27	Bonthe	70.5				..		..		..
Togo	80.46	82.49	2.03	Aneho	88.8	Lome weather station	42.6	February	2019	Sokode weather station	117.5	March	2017
Saint Helena	..	..	..	..	..			

Source: see methodology section.

Table B 2. Average Annual Temperature, Number Change, and Coldest and Hottest Temperature, Location, and Date (Month and Year) of Eastern African Countries, 2023

	Ave. Annual					Coldest				Hottest			
	Temp.		Number	Humidity		Temp.		Date		Temp.		Date	
Country	1921	2021	Change	City/Town	%	Location	Temp.	Month	Year	Location	Temp.	Month	Year
Burundi	67.84	68.95	1.11	Rumonge	72.8	..	..	..	..	..	..	..	..
Comoros	73.47	74.32	0.85	Domoni	72.6	..	..	..	..	..	..	..	..
Djibouti	82.24	83.23	0.99	Obock	85.1	..	..	..	..	..	..	..	..
Eritrea	78.08	80.37	2.29	Assab	81.6	..	..	..	..	..	..	..	..
Ethiopia	72.9	74.03	1.14	Gambela	66.8	Jimma weather station	29.1	January	2019	Dire Dawa weather station	102.2	May	2003
Kenya	75.9	77.41	1.51	Kilifi	60.8	Nairobi Jomo Kenyatta Airport weather station	37	July	2002	Mandera weather station	106.9	April	2019
Madagascar	72.57	73.17	0.6	Mahajanga	72.3	Ranohira weather station	####	July	2017	Ranohira weather station	120.9	February	2020
Malawi	71.8	73.04	1.24	Nkhotakota	50.4	Bvumbwe weather station	45.5	May	2010	Bvumbwe weather station	88.16	February	2010
Mauritius	72.82	74.66	1.84	Cargados Carajos	56.4	Seewoosagur Ramgoolam Airport weather station	54.3	September	2013	St. Brandon Raphael Island weather station	96.08	January	2020
Mayotte (2010)	..	..		..	..	..	..	..	..	..	..	..	..
Mozambique	74.61	76.15	1.49	Pemba	68.4	Maputo weather station	28	May	2007	Massangena weather station	116.1	October	2019
Reunion (2006)	..	..		..	..	..	..	..	..	..	..	..	..

Rwanda	65.41	66.58	1.17	Rwamagana	78.5	Kigali weather station	54	June	2020	Kigali weather station	87.98	March	2010
Seychelles	79.56	80.73	1.17	Victoria	73.5	..	..	..	..	..	..	..	..
Somalia	80.31	80.38	0.07	Kismayo	50.2	..	..	..	..	..	..	..	..
South Sudan	80.35	82.18	1.83	Tonj	68.9	Renk weather station	52.7	January	2002	Wau weather station	122	July	2000
Tanzania	72.07	73.4	1.33	Wete	65.6	Dodoma weather station	32	May	2021	Mtwara weather station	109.4	October	2019
Uganda	72.27	73.8	1.53	Kayunga	79.7	..	..	..	..	..	..	..	..
Zambia	70.81	71.82	1.01	Siavonga	73.8	Mongu weather station	41.9	June	2010	Mongu weather station	106.7	September	2015
Zimbabwe	69.64	71.34	1.7	Kariba	72.6	Bulawayo weather station	29.3	June	2011	Chiredzi weather station	114.1	November	2015

Source: see methodology section.

Table B 3. Average Annual Temperature, Number Change, and Coldest and Hottest Temperature, Location, and Date (Month and Year) of Middle African Countries, 2023

Country	Ave. Annual		Number	City/Town	Humidity	Coldest			Hottest			
	Temp	Temp				Temp	Temp	Temp	Date	Date		
	1921	2021	Change	%	Location	Temp.	Month	Year	Location	Temp.	Month	Year
Angola	70.38	71.13	0.75	69.1	Cabinda	60.8	August	2013	Luanda weather station	96.08	April	2016
Cameroon	76.03	77.38	1.35	86.6	Kribi	42.8	January	2001	Ngaoundere weather station	113.5	April	2021
Central African Rep.	76.87	78.4	1.53	69.5	Batangafo	48.2	January	2003	Bria weather station	114.4	February	2010
Chad	80.31	81.9	1.59	89.7	Mboursou Lere	44.6	January	2015	Moundou weather station	121.5	March	2021
Congo, Rep.	75.18	76.03	0.85	80.9	Boende	45.5	August	2010	Lubumbashi Luano weather station	101.8	November	2011
Congo (D.R.)	75.83	77.41	1.58	74.6	Pointe-Noire	35.1	November	2005	Impfondo weather station	103.8	February	2005
Equatorial Guinea	75.76	77.14	1.38	89.3	Rio Campo	62.6	August	2015	Bata weather station	107.6	May	2021
Gabon	76.6	78.17	1.57	83	Port-Gentil	49.1	April	2012	Mvengue weather station	105.4	September	2015
Sao Tome & Principe	75	76.46	1.46	72.9	Santo Antonio	..	..	..	..	..	..	..

Source: see methodology section.

Table B 4. Average Annual Temperature, Number Change, and Coldest and Hottest Temperature, Location, and Date (Month and Year) of Northern African Countries, 2023

Country	Ave. Annual		Number	City/Town	Humidity	Coldest			Hottest			
	Temp.	Temp.				Temp.	Temp.	Date	Date			
	1921	2021	Change	%	Location	Temp.	Month	Year	Location	Temp.	Month	Year
Algeria	72.99	75.07	2.08	38.9	Bejaia	7.16	January	2005	Mecheria weather station	124.3	July	2018
Egypt	71.82	74.98	3.16	52.7	Izbat al Burj	29.5	January	2019	Siwa weather station	120.2	June	2018
Libya	71.24	73.49	2.25	45	Misrata	23.9	January	2019	Gariat El Sharghia weather station	119.3	June	2010
Morocco	..	..	..	58.2	El Jadida	25.2	January	2019	Oujda weather station	121.3	July	2012
Sudan	80.22	82.71	2.49	77.9	Al Qadarif	33.8	February	2005	Karima weather station	121.3	June	2010
Tunisia	66.38	70.39	4.01	45.5	Chebba	24.1	January	2005	Gafsa weather station	122.5	August	2021
Western Sahara	..	..	..	..	..	..	..	..	..	..	..	..

Source: see methodology section.

Table B 5. Average Annual Temperature, Number Change, and Coldest and Hottest Temperature, Location, and Date (Month and Year) of Southern African Countries, 2023

Country	Ave. Annual		Number	City/Town	Humidity %	Coldest			Hottest				
	Temp.	Temp.				Temp.	Date	Temp.	Date				
Country	1921	2021	Change	City/Town	%	Location	Temp.	Month	Year	Location	Temp.	Month	Year
Botswana	69.51	71.13	1.62	Kasane	67.7	Pandamatenga weather station	32	May	2013	Maun weather station	106.5	October	2011
Swaziland	66.22	68.99	2.77	Lavumisa	42.4				..		..		..
Lesotho	51.06	54.09	3.03	Mafeteng	50.7				..		..		..
Namibia	67.5	68.22	0.72	Katima Mulilo	62.9	Grootfontein weather station	22.5	August	2014	Gobabeb weather station	113.9	March	2013
South Africa	61.97	64.51	2.54	Durban	44.5	Bloemfontein weather station	10	July	2000	Upington weather station	113.5	January	2016

Source: see methodology section.

Table B 6. Average Annual Temperature, Number Change, and Coldest and Hottest Temperature, Location, and Date (Month and Year) of Western African Countries, 2023

Country	Ave. Annual		Number	City/Town	Humidity %	Coldest			Hottest				
	Temp.	Temp.				Temp.	Date	Temp.	Date				
Country	1921	2021	Change	City/Town	%	Location	Temp.	Month	Year	Location	Temp.	Month	Year
Benin	81.63	83.66	2.03	Grand Popo	90								
Burkina Faso	83.73	86.02	2.29	Pama	63.5	Kandi weather station	52.2	January	2008	Kandi weather station	112.8	February	2013
Cape Verde	72.91	74.21	1.3	Cidade Velha	67.1	Dedougou weather station	32.2	July	2008	Dori weather station	117.5	April	2016
Cote d'Ivoire	79.43	81.27	1.84	Jacqueville	92.5	Mindelo Sao Vicente weather station	63	January	2016	Mindelo Sao Vicente weather station	92.3	June	2017
Gambia	81.43	84.2	2.77	Gunjur	76.5	Abidjan weather station	40.5	July	2018	Gagnoa weather station	114.3	July	2018
Ghana	80.98	82.94	1.96	Anloga	90.2				..		..		..
Guinea	77.34	79.86	2.52	Conakry	69.4	Accra weather station	37.2	January	2020	Accra weather station	103.1	January	2021
Guinea-Bissau	80.94	83.77	2.83	Cacheu	78.4	Conakry weather station	57.7	July	2003	Conakry weather station	109.8	July	2003
Liberia	77.09	78.57	1.48	RobertSport	81.6				..		..		..
Mali	83.61	85.6	1.92	Bafoulabe	53.8				..		..		..
Mauritania	82.29	84.74	2.45	Selibaby	60.9	Nara weather station	33.6	January	2012	Kita weather station	121.6	April	2021
Niger	81.39	82.56	1.17	Gaya	64.3	Ayoum el Atrouss weather station	36.1	September	2009	Akjoujt weather station	118.8	July	2002
Nigeria	80.33	81.81	1.48	Sapele	83.6	Bilma weather station	27.5	January	2005	Tillabery weather station.	121.6	June	2019
Senegal	82.45	85.33	2.88	Foundiougne	85.6	Yola weather station	51.9	November	2015	Yola weather station	#####	April	2010
Sierra Leone	78.67	80.94	2.27	Bonthe	70.5	Linguere weather station	34.52	January	2019	Dakar Yoff weather station	122.9	May	2002
Togo	80.46	82.49	2.03	Aneho	88.8				..		..		..
Saint Helena	..	..	..	..	..	Lome weather station	42.6	February	2019	Sokode weather station	117.5	March	2017

Source: see methodology section.

Geographic Breakdowns of the Five Regions of Africa (n = 58)

Eastern Africa (n = 20): Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mayotte, Mozambique, Reunion, Rwanda, Seychelles, Somalia, South Sudan, Tanzania, Uganda, Zambia, and Zimbabwe.

Middle Africa (n = 9): Angola, Cameroon, Central African Republic, Chad, Republic of the Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon, and Sao Tome & Principe.

Northern Africa (n = 7): Algeria, Egypt, Libya, Morocco, Sudan, Tunisia, and Western Sahara.

Southern Africa (n = 5): Botswana, Lesotho, Namibia, South Africa, and Swaziland.

Western Africa (n = 17): Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo, and Saint Helena.

Source: "Composition of macro geographical (continental) regions, geographical sub-regions, and selected economic and other groupings" Retrieved on January 29, 2019 from:
<https://unstats.un.org/unsd/methodology/m49/>.

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