

REGION 4

CENTRAL AFRICA

Cameroon	Equatorial Guinea
Central African Republic	Gabon
Congo	Zaire

Introduction

This region has a total area of 4 083 600 km² and comprises the six countries which drain in major part to the Zaire River. It extends over more than 26° of latitude, from 13°25'S in SE Zaire to 13°08'N at Lake Chad, and over nearly 23° of longitude, from 8°29'E on the Cameroon/Nigeria border, to a point 31°18'E in Lake Albert on the Zaire/Uganda border. It is bounded in the east by the Western Rift Valley, along the western rim of which many mountains rise to heights of over 3000 m, while the highest point in the region is reached on the eastern side of the rift at 5110 m asl in the Ruwenzori Mountains. The southern boundary follows the watershed between the Zambezi and Zaire Rivers for much of its length, and in this section reaches maximum altitudes of 1000 - 1600 m asl. The highest point in the north is Mt. Cameroon (4095 m asl) on a SW-NE trending volcanic ridge which extends along the Cameroon/Nigeria border. The frontage to the Atlantic Ocean is deeply indented in places and measures 2160 km. Only the Central African Republic is landlocked. A coastal plain is continuous from Congo to Cameroon, reaching 100 km wide in the north where it is densely forested. Towards the south it is narrower, 20-40 km wide, and is covered by savanna and littoral forest. In the central sector it is very swampy.

Drainage patterns within the region are controlled by three major watersheds, in the south, east and north; the Zaire/Zambezi watershed, the Zaire/Nile watershed and the Zaire/Chad Basin watershed respectively. In addition there is a series of coastal watersheds in the west from which streams flow either eastwards to the Zaire Basin or westwards to the sea. In the northwest, in central Cameroon, a quadruple watershed occurs in the Massif de l 'Adoumaoua which separates the extremities of the Chad, Niger, and Zaire Basins from a

coastal basin.

However, the drainage and physiography of the region is dominated by the Zaire River Basin which is the second largest drainage basin in the world exceeding 3 700 000 km². It extends well outside the region, spanning more than 32° of latitude and almost 21° of longitude. The southernmost tributaries, the Mulembo and Muniengashi Rivers, rise in Zambia, at a latitude of 13°13'S, while the northernmost tributary, the Kotto, rises near Mt. Dj Ngaya in the Central African Republic, 9°15' north of the equator. The easternmost tributary, feeding Lake Tanganyika, rises in Tanzania on the longitude 33°18'E, while far to the south in Zambia, a source of the Chambeshi, feeding Lake Bangweulu, lies on the longitude 33°E. Other tributaries rise in Angola, Burundi, Rwanda, Gabon and Cameroon. At its mouth the mean annual volumetric discharge of the Zaire River is 43 000 m³/sec, second only to that of the Amazon, and over its middle course in the central depression, together with its two principal tributaries the Kasai and Oubangui, it provides 3150 km of slow flowing open water surface covering some 2 000 000 ha.

The eastward flowing rivers draining the watershed along the eastern rim of the Zaire Basin discharge to the rift valley lakes. Of these, the two southern lakes, Lakes Kivu and Tanganyika, drain to the Zaire River, while the northern ones, Lakes Edward and Albert, drain to the Nile. Many rivers reach the Atlantic Ocean from the western watersheds, but from south to north, the most important are the Kouilou, Nyanga, Ogooue, Mbini, Nyong and Sanaga Rivers.

Climate

In the upper and middle atmosphere a dry easterly air flux persists over the region for much of the year, sandwiched between the semi-permanent high pressure regions over the tropics to north and south. However, in the lower atmosphere, below 2000 m asl, a mass of moist oceanic air floods across the region from the west, and this is also confined by the high pressure zones to north and south. The meeting of the moist Atlantic air mass with the dry anticyclonic masses gives rise to distinct southern and northern inter-tropical convergence zones. The position of the moist westerly air mass varies, moving north and south with the seasons, as the anticyclones over the tropics alternately strengthen and weaken. During the northern summer the moist Atlantic air mass extends between 20°N and 9°S, while during the southern summer it extends from about 20°S to 5°N. The precise limits vary from year to year, as does the maximum easterly extension. The eastern limit of the air mass, known as the Monsoon Front, is

opposed by a low level easterly stream blowing off the Indian Ocean and coming up over East Africa. The easterly extension of the Atlantic air mass over the continent is greatest during the northern summer, and in June-July the Monsoon Front may have crossed the entire region to reach 35°E. During the southern summer it withdraws westwards to 29-30°E, being just confined within the region at a time when the SE Trade Winds across the Indian Ocean are strongest.

The equatorial rain belt oscillates from north to south across the equator in the course of a year. The equator is always wet, but dry seasons of increasing duration occur in moving to higher latitudes. At intermediate distances from the equator there are two wet and two dry seasons. As one approaches the tropics the minor wet season becomes reduced in duration until at high latitudes, the two dry seasons merge. The dry seasons are thus most pronounced at the northern and southern extremities of the region where they persist for 6 months during the periods when the moist equatorial air mass is displaced from them.

The patterns of precipitation are however, rather more complex than this suggests, especially towards the Atlantic coast and the eastern boundary, where they are strongly influenced by topography. The wettest part of the region is in the northwest at Fernando Poo and the Cameroon coast. Here rain falls all the year and mean annual precipitation ranges from 3500-5500 mm on the coasts, while on the southwestern slopes of the Gran Caldera Range of Fernando PO() annual falls over 11 400 mm have been recorded, and the mean annual figure for the southwestern slopes of Mt. Cameroon reaches 9960 mm at one station. These coastal mountains, at the head of the Bight of Biafra, intercept the SW Monsoon winds as they swing inland during the northern summer, bringing peak falls of 700-800 mm during the month of August.

The second, and by far the largest perhumid zone, lies along the equator across the central depression of the Zaire River Basin. Here mean annual rainfall is lower, just 1800 2200 mm, but it is quite evenly distributed and there is no marked dry season. It increases in the east to over 3000 mm on the high mountains of the Western Rift Valley.

Precipitation decreases rapidly in passing southwards down the coast, from 4001 mm at Douala to 3000 mm at Campo, but with a wet pocket, c. 4500 mm on the Rio Muni Estuary, then declining to 2645 mm at Libreville, 1768 mm at Mayumba, 1512 mm at Pointe Noire and 800 mm at the mouth of the Zaire River. However, while rainfall decreases towards the interior, away from the wet Cameroon coast, in the south of the region it increases towards the interior, and 100 km inland, in the hills of Congo

and Cabinda it reaches or exceeds 1800 mm.

The equatorial region, including most of the central depression of the Zaire River Basin, is frequently cloudy and overcast, with about 2000 hours of sunshine/yr, increasing to over 3000 hours on the northern and southern boundaries of the region. The central depression is constantly warm, and daily temperature ranges are small, revealing little fluctuation from month to month. Mean annual temperatures are 24-25°C with mean daily maxima close to 30°C and mean daily minima near 20°C. At the boundaries of the region, temperatures are subject to wide variations, with mean daily maxima approaching 40°C in the far north during the warmest months, and mean daily minima falling to 15°C in the coolest months. A permanent snowfield exists above 4500 m in the Ruwenzori Mountains, and all along the eastern boundary frosts occur in the high mountains. Mean daily minima of 12°C are not uncommon in the populated highlands. Coastal temperatures become more variable from north to south. The temperature regime at Douala is not greatly different from that of the central Zaire depression, with a mean annual temperature of 26°C, a mean monthly maximum of 31°C in the warmest month and a mean monthly minimum of 21°C in the coolest month. By contrast the mean figure at the Zaire River mouth is 23°C with a much wider range.

Vegetation

The vast central depression of the Zaire Basin is covered by tall evergreen forest. In moving out of the depression, up the slopes of the plateaux to south and north, one traverses semi-deciduous forests, then broad leaved savannas, then *Acacia* savannas, and finally, in the north, scrub bushlands on the fringes of the Sahara. Evergreen forests extend out of the central depression into the plateau regions along river valleys, giving way to narrow galleries of evergreen and then semi-deciduous forest along rivers in the savanna zones.

Wetlands

Tidal (mangrove) forests are well developed in the northwest, in Cameroon, where high rainfall throughout the year on the coastal mountains has led to the production of bounteous alluvium and a deltaic coastline. This is so well supplied by fresh water that at high tide, river water backs up and inundates much low lying land, so that in consequence the tidal forests are saline at the seaward face but flooded by fresh water on the landward margins. Mangroves occur at all river mouths in the region, but south of Douala, extensive tidal forests are confined to major estuaries and lagoons. They are well developed

in the Gabon and Ogooue Estuaries, where again fresh water tidal forests occur, and there are extensive stands in some of the major Gabonese lagoons and at the mouth of the Zaire River.

Because of the highly seasonal precipitation patterns around the periphery of the region, many rivers in the savanna zones have floodplains. Some of these are very extensive, covering millions of hectares in the north of the region. These are covered by typical floodplain grasses, but often with galleries of swampy forests, or ribbons of levee forest along the principal watercourses.

In the central depression of the Zaire River Basin, rainfall is more or less aseasonal and the rivers are mostly brim full in their channels. However, since the major rivers are fed by tributaries rising in the surrounding savanna zones, they flood whenever their tributaries are in spate. The Zaire River, having tributaries rising far to the north and south of the equator, tends to flood for prolonged periods twice a year. Because the land is very flat in the central depression, which was once the floor of a Pliocene lake, the floods spread far from the river channels and the major blocks of swamp forest in the central depression cover more than 14 000 000 ha.

Virtually every stream entering the central depression, en route to a confluence with the Oubangui, Zaire or Kasai Rivers, floods some land along the floor of its valley. Downstream these floodplains may reach 10 km in width, while upstream they may be only a few metres wide. Throughout the central depression, and up the lower valleys of the tributaries, these floodplains are forested. However, along some rivers of the central depression, where flooding is semi-permanent, e.g. the Likouala aux Herbes in Congo, the river channels are fringed by vast meadows of floating grasses, in belts up to 5 km wide on either side of the river. These in turn are backed by swamp forests, on less deeply inundated ground. Shallow depressions in the basin are covered by permanent swamp forest, while the areas which drain and are inundated less permanently are covered by other types of forest. North of the central depression other swamp forests occur in Gabon and Cameroon, in the second per-humid area.

On the high plateaux surrounding the central depression, some large permanent swamp systems occur where rivers meander across unusually flat stretches, or flood shallow depressions, e.g. in the Shaba Province of SE Zaire. All permanent swamps at high latitudes are dominated by tall reed grasses or papyrus. However, some western plateaux, closer to the equator and the coast, in steppe zones, support extensive swamps dominated by lower growing grasses and sedges, and some tall grass swamps and montane bogs occur in the eastern highlands of Zaire.

Permanent swamps also occur on the floodplains of the rivers flowing roughly N-S along the floor of the Western Rift Valley between lakes. In the south these are covered by herbaceous vegetation, but in the north, there are swamp forests and flooded gallery forests as well as reed and papyrus swamps. The lakes of the Western Rift Valley lie along the boundary of this region. Lake Tanganyika is the second deepest lake in the world and is among the largest of the African Lakes. There are several shallow swamp fringed lakes on the southern plateau, in the Shaba Province of Zaire, several more in the central part of the Zaire Basin, numerous others on the coastal plain, and crater lakes, some fed by thermal waters, in the mountains of Gabon, Cameroon and the Western Rift Valley.

Wetland Flora & Fauna

There is a greater diversity of wetland habitats in this region than in the others. This region includes the wettest parts of Africa as well as some of the hottest and driest, and extends from sea level to altitudes in excess of 5000 m asl in the Ruwenzori Mountains. It includes fully maritime islands in the Gulf of Guinea, part of the Sahara Desert, tropical rain forest in the Cuvette Congolaise, the deep lakes of the Western Rift Valley, shallow unstable endorheic lakes like Lake Chad, and swamps and seasonal wetlands in temperate, tropical and equatorial zones. It also possesses a greater diversity of plant and animal life than the other regions and its wetland flora and fauna both exhibit marked geographical variations; they are therefore dealt with on a national rather than a regional basis.