

Chapter 2

STUDY SITES

Sterkfontein Dam Nature Reserve

The majority of the study was conducted at Sterkfontein Dam Nature Reserve (hereafter Sterkfontein) (S 28° 24', E 29° 02'), situated approximately 20 km southwest of the town of Harrismith in the eastern Free State of South Africa (Figure 2). It has a total area of 17770 ha, of which 6940 ha are covered by water when the dam is full. Altitudes vary from 1 700 m around the dam to 2325 m in the hills at the south end of the Reserve. Sterkfontein has a mild climate with summer rainfall (Figure 3). Extreme maximum and minimum temperatures recorded are 38° C and -11° C respectively with an overall average of 17° C. Annual rainfall averages 680 mm in the northern part of the Reserve, but may reach 1400 mm on the high ground of the south. Occasional snow and frequent burning have a major influence on the vegetation.

Sterkfontein is a relatively new Provincial Nature Reserve and was created as a result of the dam construction. In the early 1960's it was determined that the capacity of the Vaal Dam would not be sufficient to cater for the water needs of the Gauteng region. As a result, the Tugela-Vaal scheme was developed to pump water from the Tugela River via the Sterkfontein Dam to the Vaal Dam. Sterkfontein Dam was to act as a reservoir for the Gauteng industrial area. The Dam, a joint project of the Department of Water Affairs and Escom, was completed in 1986 and is included in the international register of the world's largest dams. On completion it was the world's second largest earth wall and the largest without a spillway. The Dam and land area around it, owned by the Department of Water Affairs, was mandated to the Free State Conservation Department and proclaimed a Provincial Nature Reserve in 1989.

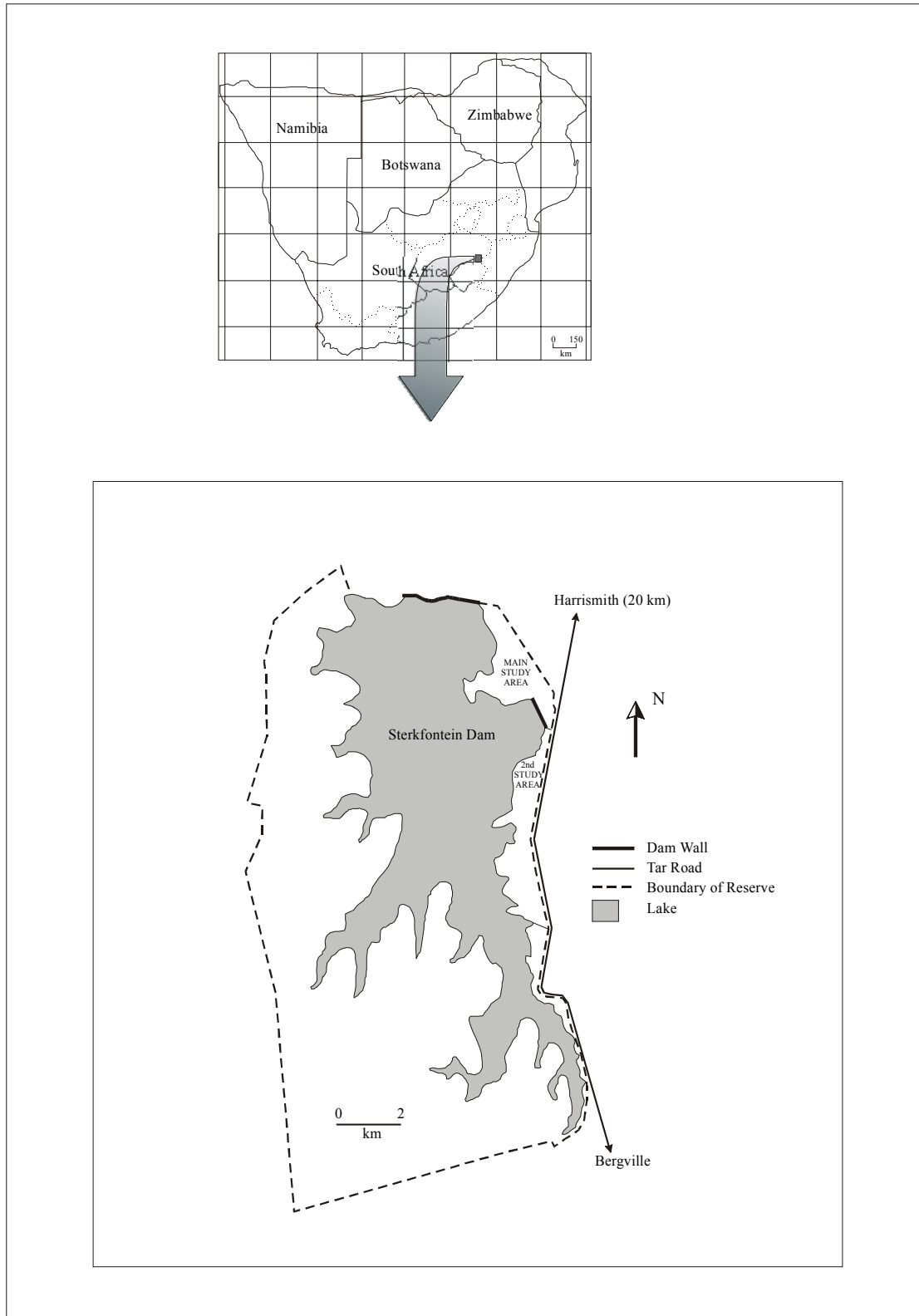


Figure 2. Sterkfontein Dam Nature Reserve.

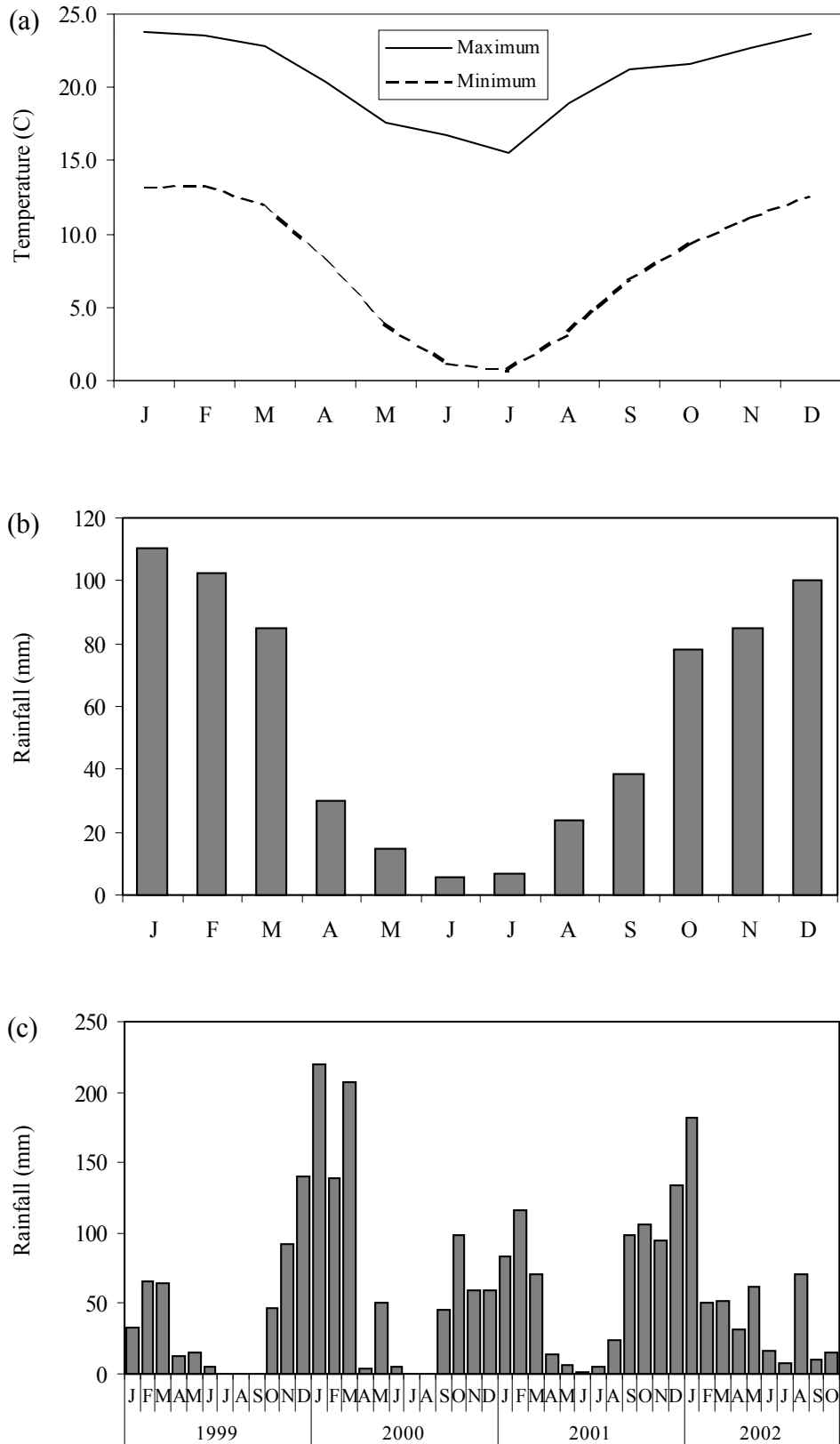


Figure 3. Climatic variables of Sterkfontein Dam Nature Reserve: (a) Maximum and minimum temperatures; (b) Average rainfall over 25 years between 1977 and 2002; (c) Rainfall in main study site during the study period.

Sterkfontein falls within the Grassland Biome, and has been split into two vegetation types: Moist Cool Highveld Grassland in the north (Bredenkamp & van Rooyen, 1996) and Wet Cold Highveld Grassland in the south (Bredenkamp, van Rooyen & Granger, 1996). In pristine condition, the former is dominated by *Themeda triandra*, with other grass species encountered including *Eragrostis superba*, *Brachiaria serrata*, *Heteropogon contortus*, *Cymbopogon plurinodus*, *Setaria sphacelata* and *Tristachya leucothrix*. There are many dicotyledonous forbs including *Tephrosia semiglabra*, *Ipomoea obscura*, *Sutera atropurpurea*, *Helichrysum* spp., *Crabbea acaulis*, *Hermannia depressa* and *Rhynchosia totta*. Deep, red (Hutton) and yellow (Clovelly) soils occur mostly on Karoo Sequence sediments but also on shale (Witwatersrand Supergroup) and andesitic lava (Ventersdorp Supergroup).

Structurally, Wet Cold Highveld Grassland is grassland, but a woody layer between 3 and 5 m may form dense thickets in places. This woody layer comprises *Leucosidea sericea*, *Euclea undulata*, *Diospyros whyteana*, *Myrsine africana* and *Rhus dentata*. North facing slopes are dry and poor in grass species, being dominated by *Hyparrhenia hirta* and *Aristida diffusa*. Other grass species include *T. triandra*, *Eragrostis curvula*, *C. plurinodus* and *T. leucothrix*. South facing slopes are relatively moist, where species rich, dense thickets with a sparse undergrowth are dominated by a non-grassy herbaceous layer. Characteristic species are the grass *Poa annua*, and forbs *Sutera polelensis*, *Stachys kuntzei* and *Clematis oweniae*. This is mountain grassland, with the typical cool, wet Drakensburg montane climate and severe frost. Soils, typical of a mountain landscape, are shallow lithosols, mainly representative of the Glenrosa and Mispah soil forms. Sandstones and mudstones of the Elliot and Molteno Formations (Karoo Sequences) and the Beaufort Group are predominant rock types.

The main study site comprised an area of 550 ha in the north-eastern sector of Sterkfontein, between the main wall and small eastern wall (Figure 2). The area was enclosed on three sides by 2.4 m high game fencing and the remaining boundary was set by the water level of the dam. The populations were, therefore, self-contained with limited influx of new genetic material. The average annual rainfall during the study was 682 mm (Figure 3c), and altitudes varied between 1700 m and 1900 m. Within this area all population studies, behavioural studies and home range investigations

were conducted. Also, in May and August 2001, two culls removed 12 mountain reedbuck, and a further two animals were collected in February 2002.

The land on the northern boundary of the study area belonged to the Department of Water Affairs. It formed steep hillsides and contained herds of grey rhebok and mountain reedbuck at densities thought to be similar to those on the side of Sterkfontein (pers. obs.). The land adjacent to the north-eastern boundary was used for commercial cattle grazing, where there were relatively low densities of grey rhebok and mountain reedbuck (pers. obs.), while that to the east was used for arable crops. There was no game on this area.

South of the main study area was a separate section of Sterkfontein, which formed the second but less extensively used study site. Although adjacent to the main study area, it was isolated from it by a game fence. This second site was situated on the south side of the small eastern wall (Figure 2) and comprised an area of approx 800 ha. Weather conditions and altitudes were very similar to those of the main study area. This section was used for culling mountain reedbuck, and between March and December 2000 four culls removed 20 animals. A further five animals were collected from this area in November 2001 and February 2002.

Tussen die Riviere Nature Reserve

Tussen die Riviere Nature Reserve (hereafter TdR) (S 30° 30', E 26° 07') is situated approximately 20 km east of the town of Bethulie in the southern Free State of South Africa (Figure 4), at the confluence of the Gariiep (formerly Orange) and Caledon Rivers. The total area of the reserve is approximately 22 000 ha and the altitude varies between 1200 and 1500 m. The climate is defined as arid (steppe), cold and dry, with a mean average temperature of 18° C (Werger, 1973). Annual rainfall averages 420 mm per year (Figure 5). TdR falls in the Eastern Mixed Nama Karoo, part of the Nama Karoo Biome (Hoffman, 1996), previously the False Upper Karoo (Acocks, 1988). Although this was considered the most degraded of all vegetation types in South Africa (Acocks, 1988), Werger (1973) recorded a marked recovery of the veld after the withdrawal of farming and the creation of TdR in 1967.

TdR has a complex mix of grass and shrub dominated vegetation types. Common shrubs include *Pentzia incana*, *Eriocephalus ericoides*, *E. spinescens* and *Hermannia* spp., while dominant grass species include *Aristida* spp., *Eragrostis* spp. and *Themeda triandra*. Tree species, including *Acacia karoo* and *Celtis africana*, are commonly found along the rivers, but are not abundant elsewhere. Beaufort Group sandstones and shales dominate the landscape, with the flat-topped landscape shaped by many dolerite dykes and sills.

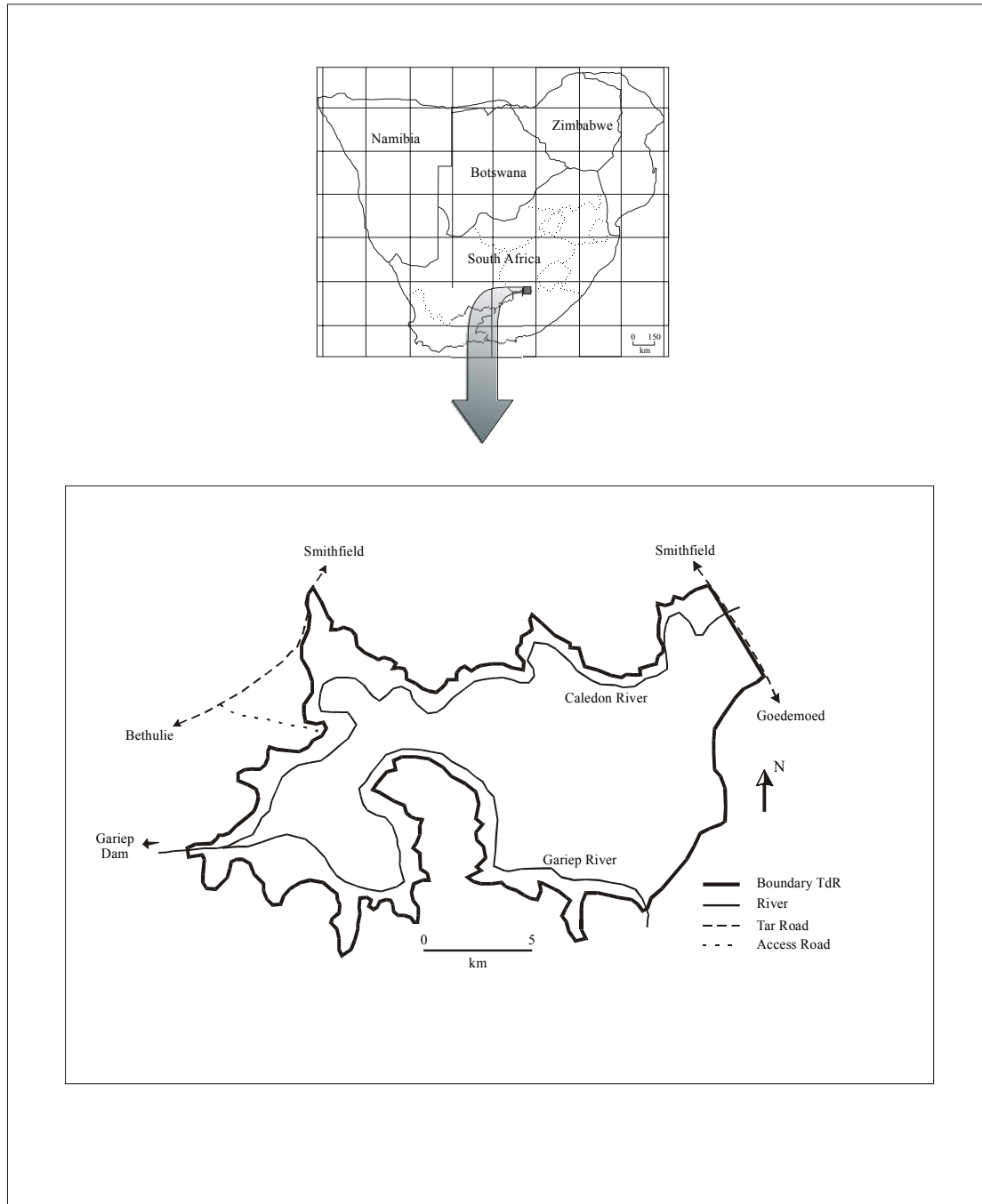


Figure 4. Tussen die Riviere Provincial Nature Reserve.

Mountain reedbuck are regularly hunted and culled at TdR and biological material was obtained from 41 animals collected between December 1999 and June 2001. No observations were made on live mountain reedbuck at TdR, while grey rhebok do not occur there.

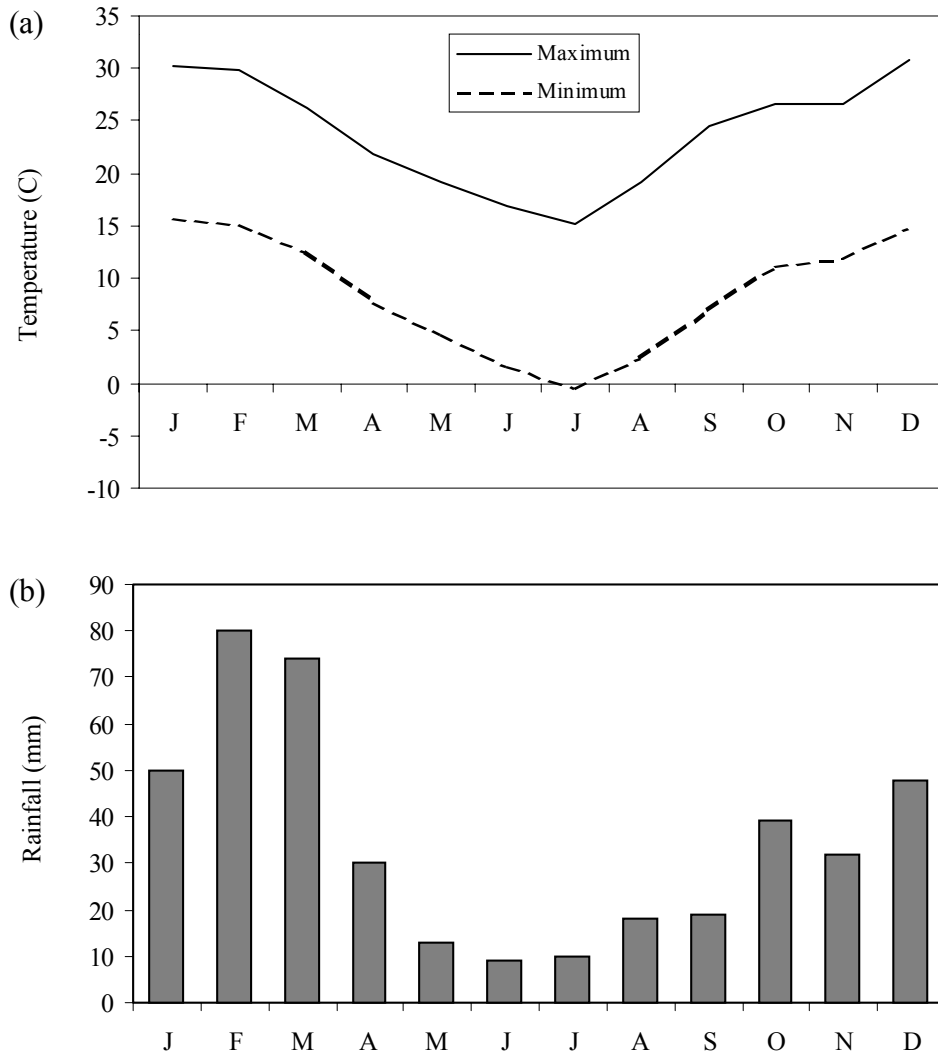


Figure 5. Climatic variables of Tussen die Riviere: (a) Maximum and minimum temperatures, (b) average rainfall for 23 years. Recorded at Goedemoed.