

## 4. Climate

### 4.1. General

The Arabian Peninsula is an ecoregion in which biomass productivity is primarily limited by the availability of water. Although there are exceptions, notably the Yemen Highlands and their extension into the Asir Mountains, the region is essentially arid or even hyper-arid. In addition to generally low rainfall amounts, rainfall distribution is usually unfavorable, coming in sudden and erratic showers, and variability is high between years.

The weather in the Peninsula is controlled by four air masses. The main reasons for the region's aridity are its remoteness in relation to the major rain-bearing weather systems, such as the North Atlantic depressions and the Indian monsoon, and its exposure to air predominantly continental in origin.

With the exception of winter in the northern part of the Peninsula and high-altitude locations, temperatures are high to very high, causing high evaporation, but also high biomass productivity, if water is available.

The low and erratic rainfall causes large fluctuations in the productivity of rangelands. It also enhances the importance of soils and landscape position in capturing the little rainfall available. Their ability to generate, concentrate, or receive runoff is the main reason for the 'patchiness' of vegetation cover in the Peninsula.

Within the overall limitations imposed by aridity, there is an unexpected diversity in climatic conditions. This diversity is usually related to differences in temperature and moisture regimes as a result of different exposure to rain-bearing systems, but also altitudinal gradients. The mountains at the edge of the Peninsula generally act as 'moisture traps.' At certain times of the year the influence of the mountains can be strong enough to generate their own weather through erratic and intensive thunderstorm activity. This is certainly the case in the Yemen and Asir highlands and the Hajar mountains in Oman. Topography also influences climate by 'guiding' wind flows and rain along favored paths. The Zagros mountains in western Iran, through this mechanism, play an important role in generating precipitation over the extreme east of the Peninsula (Fisher and Membery, 1998). In the same way, the western mountains influence rainfall production along the Red Sea.