Impacts of heavy rainfalls in El Niño 1997/98 on the vegetation of Sechura Desert in Northern Peru (A preliminary report)

by Michaela Block and Michael Richter, Erlangen

with 7 figures and 6 tables

Abstract. The Sechura desert in Northern Peru is characterized by open shrub and tree stands of a permanent community of Prosopis pallida and Capparis scabrida and an episodic occurrence of a sparse grass and herb coverage as an interim vegetation. On three study sites that differ in their edaphic condition at the coast near Paita and an additional one at Piura (Fig. 3–6) the following life forms profit from extreme rainfalls caused by ENSO events (Fig. 2):

- Therophytes react spontaneously, but only for a short time.
- Hemicryptophytes and chamaephytes show a medium-term profit for approximately one year.
- Phanerophytes indicate a long-term reaction with a still unpredictable increase of growth and a strong “regeneration push”.

In addition to the two tree species, the shrubby Acacia macracantha and Cordia lutea appear within the periodic savannas further inland around Chulucanas. Under “normal” circumstances, their development corresponds with the scheme described above whereas after Niño events the following ephemeral communities can occur in addition to the perennial ones (Fig. 7):

- An ENSO-community with progressive dynamics after heavy rainfalls.
- Post-ENSO-communities following disturbances by fire due to an extraordinary fuel accumulation and with progressive dynamics in the consecutive rain season.
- Possibly a La Niña-community stimulating only a few species after cooler periods.

Remarkable variations in the minimum and maximum number of species per sample area as well as in the life form change exist depending on the climatic ecological and the geomorphologic position of the sites (Table 6). As a future higher number of “Super-Niños” can be expected (but not necessarily a faster cycle!), the already important role of spontaneously reacting ruderal plants might increase even more.

Keywords: El Niño and La Niña, desert and tree savanna, vegetation dynamics, succession and retrogression, blooming effects and fire-ecosystem, climate change.

1 Introduction

Subtropical-tropical deserts show the highest variability in annual precipitation of all climate zones. In this context, the Piura area in the Sechura Desert of Northern Peru is known as the world’s most sensitive area regarding interannual rain anomalies. In the investigation area, so-called “Super-Niños” with extreme rain surpluses occurred in the summer months of 1804/05, 1827/28, 1877/78, 1890/91, 1925/26, 1982/83 (Quinn et al. 1987)