

# UNTERSUCHUNGEN ZUR STANDORTVARIABILITÄT IM SÜDPATAGONISCHEN REGENWALD

## VARIATION OF SITE CONDITIONS IN THE SOUTH- PATAGONIAN RAINFOREST



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## ABSTRACT

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In the present text vegetation and soil of four forest sites and one moor site of a fluvial floor surface in southern Patagonia are investigated. For every site a soil profile has been dug and described in the field. Out of the differentiated horizons mixed samples have been taken. Furthermore mixed surface samples of the organic layer and the upper mineral soil have been taken. In the laboratory soil chemical analyses on the samplings followed. The pH-value, the soil organic content, the content of total nitrogen and the available phosphate were determined. The effective and the potential cation exchange capacity and the contents of  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{K}^+$  and  $\text{Na}^+$  were measured. Furthermore analyses to quantify the nitrogen mineralisation have been done on fresh organic soil samples. For each site vegetation was described by relevés. In addition to that vegetation structure parameters were taken up to mark the sites more precisely. A specific focus of attention was on the description of the epiphytic vegetation of the particular sites.

The results of this work show an accumulation of organic substance with the time. Young sites have a thinner organic layer whereas older ones have developed a peat layer. The development of a peat layer happens irrespectively of the drainage relations. Even on rough gravel a histic epipedon has developed. At these histic sites the growth achievement of *Nothofagus betuloides* is reduced. During succession the histic epipedon have a depressing effect on the growth rate of *Nothofagus betuloides*. The larger organic layer effects increasingly bad hydrological conditions, which inhibit the growth rate additionally because of the reduced availability of nitrogen.

The pH-values of the five sites differ only slightly. The upper mineral soil of the sites with a histic epipedon shows less contents of organic substance than the younger sites. It is suggested that this is caused by the activity of soil organisms. All sites show slight phosphate contents. The contents of  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{K}^+$  and  $\text{Na}^+$  differ little in the organic horizons. In the upper mineral soil it becomes evident that the histic epipedon inhibits the supply of cations, which were released from weathering of the mineral soil compounds. In the mineralisation analyses nitrogen was almost only detected in form of ammonia. A long time incubation analysis showed the dependence of the mineralisation rate from the kind of the organic matter and the life conditions of the soil organisms. The histic epipedon of the older sites represent a nitrogen pool that could release ammonia under long-term laboratory conditions. Under real conditions the mineralisation rate may be much lower because of the inconvenient hydrological circumstances and the low temperatures.

In addition to that two special sites have been sampled and analysed: the organic matter between epiphytes and the living tree trunks in the youngest forest site and the organic material of a dead tree trunk in a peaty forest site. The investigations of the epiphytic humus provided interesting results. Concerning soil chemistry the best conditions could be noticed. Especially the content of available phosphate and the mineralisation rate was much higher than in the other soil samples. This special site is used by *Nothofagus betuloides*. The trees develop adventive roots in the epiphytic humus and profit from the favourable soil conditions.