

## Introduction

The presented study focuses on determining the factors that influenced the present position of the alpine forest-tundra ecotone in the High Sudetes. The existence of this ecotone is most caused by altitudinal gradient and related change of climatic conditions (Körner 1999). Nevertheless, the position of the alpine timberline (e.g. upper limit of closed forest) is greatly influenced by many other variables such as relief, edaphic conditions, competition or human intervention (Holtmeier 2003). Many fluctuations of the timberline were or are observed both throughout the Holocene and nowadays (Frenzel et al. 1993, Graumlich et al. 2005). This enables us, together with data from ecophysiological studies (Tranquillini 1979, Körner 1999), to regard the alpine timberline as a real indicator reflecting the changes of the environmental components that influence its position. First of all it is the case of climatic changes (Kullmann 1998). However, to be able to record the response of the alpine forest-tundra ecotone to climatic changes, it is essential to know the weight of the individual factors influencing the position and the overall formation of the timberline in a given area (Holtmeier & Broll 2005). Nowadays a whole range of data about timberline dynamics in the Alps (eg. Dullinger et al. 2005, Paulsen & Körner 2001, Tinner & Theurillat 2003) and Scandes (eg. Eronen 1979, Kullmann & Kjällgren 2000, Kullman 2007) is known. However, actual information from the area between these two units is only fragmentary. On the other hand it was in this region, where the basic studies describing and delimiting the alpine forest-tundra ecotone in Vosges (Carbiener 1963), High Sudetes (Jeník & Lokvenc 1962, Alblová

1970, Plesník 1972) and Carpathians (Plesník 1971 and many of his other works) were made. The aim of the presented doctoral thesis was to take up and further develop the mentioned studies, namely in the area of our highest mountains, i.e. the Giant Mts., the Hrubý Jeseník Mts. and the Králický Sněžník Mts.. The specific aims of the research were notably:

- to describe the course of the alpine timberline in the mentioned mountain ranges;
- to determine the factors influencing the actual position of the alpine forest-tundra ecotone and their weight;
- to trace the changes in alpine forest-tundra ecotone position based both on palaeogeographical data from the Holocene and on relatively accurate pictorial information from the recent past

To achieve the above mentioned goals, several methods including processing data from remote sensing, analyses of spatial data using Geographical Information Systems, field mapping and transect measuring, dendrochronological methods, palaeogeographical methods or partial microclimatic applications were used.