The observed and projected temperature changes in the Alpine region

Abstract

The paper presents comparison and evaluation of articles literature of the mentioned topic with a focus of the Swiss and Wallis Alps. The first chapter describes the physical geography of the region and mostly reminds us with Alpine specifics related to the paper's goal – ocean-continental climate, typical wind movement (the wind „foehn"), slopes orientation a steepness, snow line, forest bounds, existence of glaciers and lakes – and then mostly characterizes the air temperature in recent years.

The next chapter analyzes observed temperatures in more detail. Temperatures show a long-term trend of increasing, particularly from the year 1980. More steady development is presented by the mean day minimum, rather than maximum. There is some debate when comparing lowlands and highlands – some works show bigger increase in lowlands than in highlands, some vice versa. This might be caused by the research methodology. When analyzing seasonal trends, the highest altitude sensitivity belongs to the winter season; the smallest sensitivity to the autumn. It appears that when above the 0 °C isotherm, the altitude is a small factor of the warming differences.

Two categorisations of the emission scenarios are applied when projecting the future air temperatures – the higher emissions, the higher the projected tempretaure change. In average the annual Alpine temperature is supposed to increase by 3 °C, by the end of the 21th century. According to one of the emission scenarios, up to 94 % of the Alpine glacier volume is lost by the same time. More evidence show that relation between the altitude and the extent of the warming exists, however there is some debate about that.

Numerous factors influence the Alpine air temperature – greenhouse gases, albedo, aerosols, the extent of incoming radiation, cloud cover, water vaporization, density of forestation.Consequences of the warming are of natural (rivers and their flow, shift of the snow line) and socioeconomical (Alpine tourism and skiing) nature.