On the integrated assessment of climate change using climate classification

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The analysis of climate patterns can be performed for each climate variable separately or the data can be aggregated using e.g. some kind of climate classification. These classifications usually correspond to vegetation distribution in the sense that each climate type is dominated by one vegetation zone or eco-region. In case of the Köppen-Trewartha classification it is integrated assessment of temperature and precipitation together with their annual cycle as well. This way climate classifications also represent a convenient tool for the assessment and validation of climate models and for the analysis of simulated future climate changes.

The Köppen-Trewartha classification is used on full CMIP5 family of more than 40 GCM simulations and CRU dataset for comparison. This evaluation provides insight on the GCM performance and errors for simulations of the 20th century climate. Common regions are identified, such as Australia or Amazonia, where many state-of-the-art models perform inadequately. Furthermore, the analysis of the CMIP5 ensemble for RCP 4.5 and 8.5 is performed to assess the climate change for future. There are significant changes for some types in most models e.g. increase of savanna and decrease of tundra for the future climate. For some types significant shifts in latitude can be seen when studying their geographical location in selected continental areas, e.g. toward higher latitudes for boreal climate.