



The role of atmospheric circulation in cloudiness over Europe

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Atmospheric circulation has an important influence on the weather conditions over Europe. The circulation features play, for instance, dominant role in the formation of clouds. The cloud cover is the main climate element that determines the radiation balance of the active surface and thus influences the greenhouse effect. Unfortunately, this climatic component is not incorporated in any detail in General Circulation Models (GCMs). For this reason, a study has been carried out concerning the relationship between the atmospheric circulation and the cloudiness over Europe over the 1961-2000 period. All analyses are based on grid data (resolution $2.5^\circ \times 2.5^\circ$) derived from The European Centre for Medium-Range Weather Forecasts - ECMWF ERA40. In addition, the well-established circulation calendar "Grosswetterlagen" was used. The results show that grid data are a good source of information for the total cloud cover. Compare analysis for a few meteorological stations from Europe yielded consistence grid and station data (ORNL/CDIAC 123 NDP-026c). The investigations confirmed that the total cloud cover was a direct result of macro-scale circulation processes in large areas. Particular circulation types produced different cloudiness values. The highest values in Central Europe appear to be associated with cyclonic patterns (TrM, SWz, HFz). Much smaller values are related with anticyclonic patterns (Sa, SEa, HM). Local factors, however, can be responsible for local diverging relationships.