Geophysical Research Abstracts, Vol. 8, 00830, 2006
SRef-ID: 1607-7962/gra/EGU06-A-00830

Trend analysis of circulation types and their influence on the present and future mineral dust cycle over Central Europe

M. Demuzere (1,2), M. Werner (2), N. Van Lipzig (1)

(1) Physical and Regional Geography Research Group, Catholic University Leuven, Belgium,
(2) Max Planck Institute for Biogeochemie, Jena, Germany

(Matthias.Demuzere@geo.kuleuven.be / Phone: +32 16326424 / Fax: +32 16326400)

Several both subjective and objective methods for the classification of circulation patterns into categories have been developed over the past century. The recent increased interest in this procedure is attributed to its utility in solving a wide array of climatological applications. In this study, an automated classification based on Sea Level Pressure (SLP) is used to examine present and future trends in circulation patterns over Central Europe. Twenty-seven weather types derived using the Jenkinson-Collison daily Weather Type classification (JCWT) are subdivided into 8 directional types, 2 vorticity types and 1 unclassified category. A transient future climate simulation with the most recent version of the Max Planck Institute for Meteorology Earth System Model, ECHAM5/MPI-OM1, provides the simulated SLP data to study the mean monthly, seasonal and annual trends between 1958–2100. First of all, the ECMWF – ERA40 reanalysis dataset is used to evaluate the obtained JCWTs based on the ECHAM5 model outcome for the period 1958–2001. Secondly, long-term trends of weather types are calculated and statistically investigated using the ECHAM5 SLP output between 2001-2100. Furthermore, the presented research analyses aim to identify the climatological relationships between the synoptic circulation and the atmospheric aerosol loading by mineral dust over central Europe. The latter is provided by the atmospheric aerosol module HAM, which has been coupled to the ECHAM5/MPI-OM1 model for the analyzed future climate simulation. Long-term trends in circulation and especially directional weather types are believed to play an important role in long-range mineral dust transport, aerosol loading and dust deposition rates. Therefore

it is useful to investigate JCWTs trends and the method's potential predicting future changes of the mineral dust cycle.