



Weather types and strokes in the Augsburg region (Southern Germany)

Christoph Beck (1), Michael Ertl (2), Esther Giemsa (1,3), Jucundus Jacobeit (1), Markus Naumann (2), and Stefanie Seubert (3)

(1) University of Augsburg, Institut für Geographie, Physische Geographie und Quantitative Methoden, Augsburg, Germany (christoph.beck@geo.uni-augsburg.de), (2) Neurological Clinic and Clinical Neurophysiology, Klinikum Augsburg, Augsburg, Germany, (3) Environment Science Center, University of Augsburg, Augsburg, Germany

Strokes are one of the leading causes of morbidity and mortality worldwide and the main reason for longterm care dependency in Germany. Concerning the economical impact on patients and healthcare systems it is of particular importance to prevent this disease as well as to improve the outcome of the affected persons. Beside the primary well-known risk factors like hypertension, cigarette smoking, physical inactivity and others, also weather seems to have pronounced influence on the occurrence and frequency of strokes. Previous studies most often focused on effects of singular meteorological variables like ambient air temperature, air pressure or humidity. An advanced approach is to link the entire suite of daily weather elements classified to air mass- or weather types to cerebrovascular morbidity or mortality.

In a joint pilot study bringing together climatologists, environmental scientists and physicians from the University of Augsburg and the clinical centre Augsburg, we analysed relationships between singular meteorological parameters as well as combined weather effects (e.g. weather types) and strokes in the urban area of Augsburg and the surrounding rural region. A total of 17.501 stroke admissions to Neurological Clinic and Clinical Neurophysiology at Klinikum Augsburg between 2006 and 2015 are classified to either “ischaemic” (16.354) or “haemorrhagic” (1.147) subtype according to etiology (based on the International Classification of Diseases - 10th Revision). Spearman correlations between daily frequencies of ischaemic and haemorrhagic strokes and singular atmospheric parameters (T, Tmin, Tmax, air pressure, humidity etc.) measured at the DWD (German weather service) meteorological station at Augsburg Muehlhausen are rather low.

However, higher correlations are achieved when considering sub-samples of “homogenous weather conditions” derived from synoptic circulation classifications: e.g. within almost all of 10 types arising from a classification of central European mean sea level pressure fields into “Großwettertypes” (Beck 2000) the relationships between meteorological variables and stroke frequencies are increasing. Mainly temperature variables (Tmin, Tmax, Tmean) appear to be important particularly in winter and summer. Moreover distinct correlations of similar magnitude are obtained with other variables like wind speed or precipitation for specific weather types (e.g. westerly type). In how far these initial findings do really point to additional health impacts beyond temperature effects is subject of ongoing work.