



Semi-objective classification and statistical analysis of weather types over South Patagonia

C. Schneider (1), A. Frank (1)

(1) Department of Geography, RWTH Aachen University, Germany
(christoph.schneider@geo.rwth-aachen.de)

In this study synoptic type weather patterns ("Grosswetterlagen") for southernmost South America are presented. The weather types were classified using National Centre of Environmental Prediction (NCEP) / National Centre of Atmospheric Research (NCAR) reanalysis data. A semi-objective correlation method that uses daily fields of NCEP/NCAR sea level data was applied which could. This method can easily be integrated into GIS.

Ten weather types were identified and all of these can be significantly distinguished by a U-test (Mann/Whitney) using meteorological observations from weather stations in southwest Patagonia. Each of the weather types is characterized by a specific combination of cyclonic or anti-cyclonic pressure field and a specific direction of advection so that distinct departures from mean wind direction, wind velocity, precipitation, global radiation, temperature and relative humidity are observed.

Four weather types (west, southwest, northwest and pacific trough) account for 60% of all days. These weather types are determined by strong west wind conditions. Three weather types that make up 17% of all days (high pressure ridge, high pressure bridge and south) are characterized by anti-cyclonic high pressure conditions. A strong high pressure system over the Atlantic drives two weather types (east and north) that account for 6.4% of all days. A weather type with overall weak pressure gradients can be found on 5.8% of the days. Only a small part of 10.3% of all days were not assigned to a specific weather type.

The results obtained from the two-year calibration period (October 1999 - September 2001) are confirmed in terms of relative occurrence by a subsequent classification of the 20 year period from 1980 to 2000 which returns similar results.

The identified weather types were compared to six synoptic situations (west, northwest, southwest, east, weak pressure gradient and high pressure ridge) as described by Endlicher (1991). All of the six synoptic weather situations were found but an additional set of four weather types was obtained that altogether cover a significant period.

The seasonal distribution shows that weather types 'west', 'high pressure ridge' and 'weak pressure gradient' occur predominantly in summer, whereas 'northwest', 'pacific trough' and 'north' are typical for the winter season. 'High pressure ridge' and 'east' do mostly occur during spring and fall.