Geophysical Research Abstracts,
Vol. 11, EGU2009-4391, 2009
EGU General Assembly 2009

Composite analysis of the North Atlantic extratropical cyclones: application to climate variability and change in cyclone activity

I. Rudeva and S Gulev
IORAS, SAIL, Moscow, Russian Federation (gul@sail.msk.ru)

We analyse cyclone activity in the Northern Hemisphere by performing numerical storm tracking of mid-latitudinal cyclones in reanalyses. Besides identification of storm trajectories, storm tracking algorithm allows for estimation of cyclone size and for the development of the accurate cyclone composites. Composites are derived by the co-location of cyclone characteristics for individual regions and particular stages of cyclone development. Compositing methodology involves local coordinate transforms and spatial scaling of cyclone geometry. For every composite we quantified (by integrating within the cyclone area) heating and evaporation provided by air-sea interaction processes, heat and precipitable water content and precipitation. This analysis allowed for the estimation of heat and water vapor balances which were derived for different cyclone life time stages for the cyclones propagating over the North Atlantic mid latitudes. Analysis of cyclone energy characteristics helped to further estimate the heat and moisture transport by Atlantic cyclones to Europe. Cyclone composites and characteristics of the cyclone life cycle including cyclone size were analysed for different climate periods from 1950s to 2000s revealing climate variability in the structure of cyclones and their role in the heat and moisture advection in mid latitudes. These parameters were further associated with the mean atmospheric circulation characteristics in order to link the changes in cyclone trajectories with the evolving cyclone size and energy characteristics.