



Cyclone activity in different modern reanalyses: comparative assessment

Natalia Tilinina (1,2), Sergey Gulev (1,2), Irina Rudeva (1,2), and Peter Koltermann (2)

(1) P.P. Shirshov Institute of Oceanology RAS, Moscow, Russia (tilinina@sail.msk.ru), (2) Lomonosov Moscow State University, Moscow, Russia

In order to evaluate different reanalyses (MERRA, JRA, ERA-Interim, NCEP1, 20th Century Reanalysis) we performed cyclone tracking of the reanalysis outputs and quantified the parameters of the cyclone life cycle in different products. The period analysed spans from 1979 to 2009 with the overlap of all products during 1989-2004. For cyclone tracking we used a numerical scheme developed at P.P. Shirshov Institute of Oceanology, RAS, operating with 6-hourly SLP fields. New high resolution grid was used for mapping cyclone numbers and frequencies. Cyclone activity over the Northern Hemisphere was characterized by the cyclone numbers and frequencies as well as by the characteristics of the cyclone life cycle, such as lifetime, migration, intensity, deepening rate etc. The two main questions to be addressed are (i) whether storm tracking is an effective tool for evaluation of global reanalysis products and (ii) which cyclone characteristics exhibit significant differences in modern reanalyses? Cyclone counts are significantly different in different products. In particular, MERRA reveals about 25% more cyclones than the other reanalyses. The strongest regional differences are observed over the continents and in the Arctic. Higher resolution products typically show higher cyclone counts for relatively shallow and short living cyclones. At the same time for the intense events most reanalyses show similar results, especially over the oceanic storm tracks. MERRA reanalysis shows higher occurrence of the very deep cyclones compared to the other products even of similar spatial resolution. Product-to-product differences in the advanced characteristics of the cyclone life cycle, such as cyclone size and geometry are discussed.