

Soil Moisture Variability in European Russia and its Links to Regional Climate During Summer

Igor ZVERYAEV¹, Alexey ARKHIPKIN¹

¹ *Shirshov Institute of Oceanology, RAS, Moscow, Russia*

Soil moisture data from the GLEAM (Global Land Evaporation Amsterdam Model) dataset for 1980-2014 are used to investigate the leading modes of interannual variability of soil moisture in European Russia during summer season. An EOF (Empirical Orthogonal Functions) analysis performed on the monthly means (i.e., separately for June, July and August time series) revealed three leading modes of soil moisture variability, characterized by the monopole (EOF-1), zonal dipole (EOF-2) and meridional dipole (EOF-3) patterns. These modes explain respectively 29-35%, 11-18% and 10-13% of the total variability of soil moisture. Analysis of correlations between the leading PCs (principal components) of soil moisture and indices of regional teleconnections suggests that there are not very strong, but statistically significant links between regional soil moisture variability and the Scandinavian teleconnection, the East Atlantic – Western Russia teleconnection and the Atlantic Multidecadal Oscillation. The leading PCs capture pretty well the large soil moisture anomalies associated with regional climate extremes (such as extremely dry conditions associated with the Russian summer heat wave in 2010). An analysis of links to regional climate parameters revealed generally consistent patterns in which positive (negative) soil moisture anomalies are linked to cyclonic (anti-cyclonic) anomalies of sea level pressure, above (below) normal precipitation and negative (positive) anomalies of air temperature.

Key words: soil moisture, European Russia, teleconnections, summer season