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Analysis of Snow Cover Characteristics in Relation of Anticyclone Blocking Conditions

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Blocking anticyclones are slow-moving anticyclones of middle latitudes which block the normal west-to-east movement of migratory extra-tropical depressions. Due to their influence on local and regional weather they have been intensively studied in atmospheric sciences. Since blocking anticyclones result in the same kind of weather for extended period (e.g. bringing a lot of precipitation), their effect on hydrological cycle is important, too. We have studied the relationships of blocking anticyclones with snow water equivalents in the eastern and central parts of former USSR. Combined SWE data from the ERA-40 and the JRA-25 reanalyses have been analyzed in relation to anticyclone blocking conditions using composite analysis. For this purpose, preliminary analysis of periods of the most and the least intensive blocking anticyclonic activity over the eastern and central parts of former Sovier Union was performed. Catalog of quasi- stationary and blocking anticyclones with their main descriptive characteristics was prepared by the analysis of daily synoptic maps at surface and at 500mb levels for period 1949-2007. Composite SWE data for the two blocking activity classes were then produced. Statistical significance test was applied to composite difference maps at each point of grid with purpose of identification statistically significant anomalies of SWE related with blocking conditions. This analyses identified the areas in which the snow cover characteristics are sensitive to the occurrence of the blocking anticyclones. Long-term variability of snow cover area derived from satellite data versus variability of duration in days blocking situations during winter season have been analyzed as well.

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