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Snow Cover Characteristics over the Main Russian River Basins as Represented by Reanalyses and Measured Data

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ABSTRACT

Snow water equivalents (SWE) produced by the National Centers for Environmental Prediction–U.S. Department of Energy (NCEP–DOE) and 40-yr European Centre for Medium-Range Weather Forecasts (ERA-40) reanalyses and snow depths (SD) produced by the 25-yr Japanese “JRA-25” reanalysis over the main Russian river basins for 1979–2000 were examined against measured data. The analysis included comparisons of mean basin values and correlation of anomalies, as well as seasonal and interannual variabilities and trends. ERA-40 generally provided better estimates of mean SWE values for river basins than did the NCEP–DOE reanalysis. Mean SD values from the JRA-25 reanalysis were systematically underestimated. The best correlations among the anomalies were given by ERA-40, followed by JRA-25. All reanalyses reproduced seasonal variability well, although the differences in absolute values varied substantially. The highest differences were typically connected with the snowmelt period (April and May). Interannual variability confirmed the errors of ERA-

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40 and JRA-25 in 1992–94 and 1979–83, respectively. Otherwise, the reproduction of the interannual variability of SWE and SD was reasonable. Strong biases in SD data from JRA-25 that decrease with time induce artificial positive trends. Significant underestimations of SWE data by ERA-40 for 1991–94 influenced the values of the trends. NCEP–DOE reasonably represented the trend found in measured data. In general, the highest discrepancies between measured and reanalysis data were found for the northern European and eastern Asian rivers (Pechora, Lena, and Amur). The assessment of the quality of SWE and SD reanalysis data can help potential users in the selection of a particular reanalysis as being appropriate to the purpose of their studies.

- [M. Breiling](#)

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