

Surface energy balance models performance in wetland ecosystems: Upper Biebrza Basin case study

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Wetland ecosystems covers only about 2% of the Earth surface and about 6% of land. Despite such small area, this ecosystems plays an important role in the global water cycle, protecting biodiversity and in the global carbon cycle. Therefore wetlands are important ecosystems and numerous efforts for protection them have been taken in global (e.g. Ramsar Convention on Wetlands), continental (e.g. EU Water Framework Directive) and local (e.g. establishing national parks for protection of wetlands) scale. Preservation of the suitable state of wetland depends mainly on adequate soil hydration resulting of water cycle components. The most important component of the water cycle in wetlands is evapotranspiration. Hence, measurements and modelling of the evapotranspiration in this ecosystems is crucial for determination of underlying processes which are important for preservation of the wetlands.

The main aim of this study is to compare the performance of two surface energy balance models, SEBS (Surface Energy Balance System) and SEBAL (Surface Energy Balance Algorithm for Land), in the Upper Biebrza Basin (NE Poland), which is a part of one of the biggest wetlands in Europe. Both of the models are based on remotely sensed data (surface temperature, DEM and vegetation properties), and basic meteorological data. In this study Landsat 8 data from vegetation seasons (April – September) 2014-2017 was used. The results from both models were compared with each other and with ground truth data measured using the eddy covariance method. The eddy covariance tower is located in the Upper Biebrza Basin on the fen. The results show that further work on these types of models applied to wetlands ecosystems should be performed. In further investigations ground truth data for validation and improvement of input parameters should be collected.

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