

INTERNATIONAL SOIL AND WATER ASSESSMENT TOOL CONFERENCE

# SWAT 2017

June 28 – 30 | Warsaw, Poland



Book of Abstracts



The Soil and Water Assessment Tool (SWAT) is a public domain model jointly developed by USDA Agricultural Research Service (USDA-ARS) and Texas A&M AgriLife Research, part of The Texas A&M University System.

SWAT is a small watershed to river basin-scale model to simulate the quality and quantity of surface and ground water and predict the environmental impact of land use, land management practices, and climate change. SWAT is widely used in assessing soil erosion prevention and control, non-point source pollution control and regional management in watersheds.

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## SWAT applications for transboundary river management between EU, Ukraine and Russian Federation

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### Abstract

Water cycle in the basin is the main factor of water budget, sediment and nutrient loads. Transboundary water problems are becoming urgent because of significant differences in national legislation and water management. International cooperation in water management needs compatible results on evaluating catchment use consequences for water budget and chemistry. Common type of complex results can be obtained using the same methods for different catchments. Modern international water resource management should be based on detailed knowledge about water regime as the main factor of matter flows.

Meteorological and hydrological conditions as well as site characteristics are the main factors that determine the water and matter flows in river basins. In transboundary basins the handling of the quantitative and qualitative aspects of the water flows is a complex task because of significant differences in data quantity, quality and types of data source.

The European Union, Ukraine and Russia share various river basins that cross one or more international borders such as Western Bug, Desna and Western Dvina (Daugava). Water quality problems that need to be dealt with in a transboundary setting are the connective element of these basins. One of the ways to provide transnational system analysis and dialogue is Integrated Water Resources Management (IWRM). Within the project Management of Transboundary Rivers (MANTRA-Rivers), which is funded by the Volkswagen Foundation, Scholars and Scientists from Ukraine, Russia and Germany work together to promote trilateral dialogue and cooperation and investigate the scientific basis for an IWRM conceptualization in the three model river basins.

In this contribution we focus on Western Dvina (Daugava) catchment. The basin is situated in Russian Federation, Belarus and Latvia (and small parts in Lithuania, Estonia). Russian part of basin has extremely weak hydrological and meteorological gauging stations network. ArcSWAT input data is based on different sources of land cover (GlobCover, OpenStreetMap, remote sensing data), soil characteristics and distribution (National soil registry combined with FAO and HWSD characteristics), relief (SRTM), meteorological data (observations, NCEP CFSR and ERA-Interim data combination). The comparison of reanalysis data with observed meteorological characteristics reveals a lot of uncertainties (especially in precipitation amount) and gaps (wind speed and solar radiation) as the SWAT input data. Russian soil data is also specific and is not directly compatible to global databases and needs to adapt to SWAT database. Calibration using SUFI2 method was performed using SWAT CUP. First results of hydrological modeling of Western Dvina (Daugava) are presented.

### Keywords

SWAT, Transboundary catchments, Western Dvina (Daugava), Water regime, Hydrology, Calibration, ERA-Interim, NCEP CFSR