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Assessment of climate change impact on water resources in the South-East part of Romania, using different spatial resolution atmospheric model output

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The simulated flow by WatBal model in actual and forthcoming climate change conditions allows the assessment of climate change impact in water resources of Buzau and Ialomita river basins.
The area of Buzau and Ialomita river basins is located of the outside of Curvature of the Carpathian Mountains, into a zone where the altitude varies from 2500m to 50m. In conformity of altitude, the annual precipitation varied from 1400 mm/year, in the mountainous area to 400 mm/year in the plane area and the evapotranspiration between 500 mm/year in the high area to 850 in the plane area. However, due to a very high variability of weather conditions, droughts as well as excessive humidity periods occur in the course of a year.
The WATBAL model is an integrated water balance model with monthly time step model and it is combined with the Priesley-Taylor method for calculating the potential evapotranspiration.
WatBal model was calibrated by simulation of monthly average flow during 1971-2000 in 4 cross-sections of Buzau catchment and 13 cross-sections of Ialomita river basin. The time series data input in WatBal model, necessary to calibrate the model parameters of this model in Buzau and Ialomita river basins include: rainfall, air temperature and relative humidity, sunshine duration, wind speed and flow in the analyzed sections.
In order to assess the impacts of climate change in water resources in selected area ware used as input data the results of different global and regional climatic models, with different spatial resolution, and a comparison of these hydrological simulations it is made.
In a first stage, the assessment of climate change impacts on water resources was based on a total of 27 climate scenarios determined by 3 global circulation models, ECHAM3/OPYC4, HadCM3 and NCAR-PCM each of these models being applied for three time horizons (2025 , 2050, 2100) and three intensities of climate changes phenomena.
In the second stage, the analysis of the impact of climate change on hydrological regime was performed using the simulations with a regional climate model with 25 km grid spacing developed by the ICTP (Trieste, Italy) and interpolated at a resolution of approx. 11 km. Potential monthly and annual flow modification was assess for two time horizon 2021-2050 and 2071-2100.
The third part of the study used as input data the results of regional climatic model with 10 km resolution and assesses the impact of climate change in water resources also for the two periods 2021-2050 and 2071-2100.