# Analysis of climate change on Portuguese watersheds

S.A. Simões[1], M.T. Santos[1], T.Trindade[1]

[1]Área Departamental de Engenharia Química, Instituto Superior de Engenharia de Lisboa, Instituto Politécnico de Lisboa, Rua Conselheiro Emídio Navarro 1, 1959-007 Lisboa, Portugal
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Presenting author email: tsantos@deq.isel.ipl.pt

Climate change has been studied in the last years as potential drive for hydrological alterations, with several environmental impacts such as changing precipitation, evapotranspiration, weather events, reducing snowfall and ice regions (Pumo *et al*., 2016; Viola *et al*., 2017). Water resources constitute national strategic reserves, being fundamental for the subsistence of populations and growth of the economy. Climate change has also considerable impacts on the environment at a global level, affecting the different components of the hydrological cycle that is in terms of water resources quantity and quality. On the other hand, the urbanization process and the land use also significantly contribute to the hydrological changes. Urban population is growing worldwide particularly due to the increased migration fluxes towards urbanized areas (Pumo *et al.* 2017), placing additional stress on the land-use planning policies. So, it is imperative to develop scenarios along sensitive watersheds, oriented towards the data production, which improve the knowledge of systems response.

In the present work it is intended to assess the effect of climate change and land use (or land cover) dynamics on the surface masses existing in Portugal, which are the predominant origin for drinking water, used for domestic and industrial consumption. To achieve the objective, numerical modelling is applied, through dynamic models to test scenarios, involving the analysis of parameters such as soil, vegetation, sunlight exposure, precipitation, water pH, temperature, dissolved oxygen and other, in Portuguese hydrographic basin. This analysis uses the computational code SWAT (Soil & Water Assessment Tool) which is a semi-distributed physically based model of watershed in daily, monthly and yearly calculations. The SWAT also includes valuable simulations of vegetation growth and biomass (Gassman et al. 2007). For SWAT model calibration and validation, it was used a minimum of 15 years datasets, where the first 10 years were used as calibration data and the remaining 5 years were used to validate the model outputs (Figure 1).

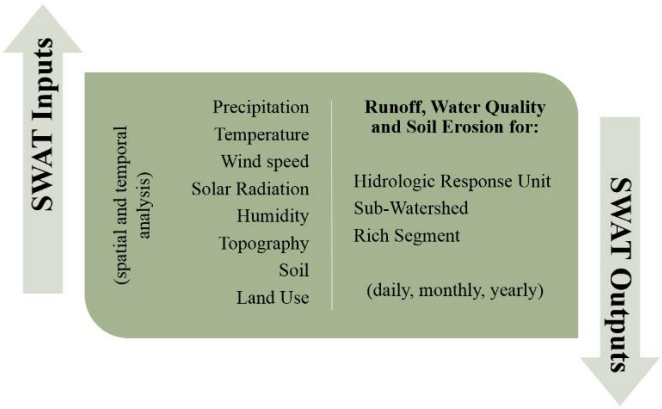


**Figure 1.** Overview of the SWAT model: input/output parameters.

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