**Conference on large African rivers**

Session 1: Global change, climatology and hydrological regimes

***Time series analysis of actual evapotranspiration estimated using rainfall-runoff budget. Application to Medjerda basin***

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Accurate quantification of the amount and spatial variation of actual evapotranspiration is a key task in studying hydrological regimes. Actual evapotranspiration is controlled especially by rainfall and net radiation depending on climate conditions. Actual evapotranspiration will likely be affected by the climate change. This study aims to present a tentative of estimating spatial and temporal variability of actual evapotranspiration AET in Medjerda basin which covers the latitudes 35° to 37° and longitudes 8° to 11° using water balance computation. Four basins are mainly studied which are: Siliana basin (2190.8 Km²), Tessa basin (2032.7 Km²), Bouheurtma Basin (384.2 Km²) and Barbara Basin (109.4 Km²). Therefore the Bucket Bottom Hole (BBH), a water balance model is calibrated. This model adopts three kinds of inputs: daily rainfall series, daily potential evapotranspiration (PET) series and lumped pedo-transfert parameters. The latter are estimated using the pedology map of the study area. The rainfall series are in situ data obtained from the rainfall stations situated in Medjerda basin. PET series are calculated from meteorological data applying Penman Monteith equation. The model was calibrated using daily runoff data adopting equifinality approach. Sets of parameters presenting acceptable annual relative bias and monthly and decadal Nash were selected. It is found that the decadal values of actual evapotranspiration are almost the same during the winter months independently from the selected sets of parameters. Conversely, during the spring and summer, AET estimates are parameters depending. Thus parameter uncertainty is reflected in seasonal AET. On the other hand, for each selected solution, the mean interannual decadal AET is evaluated, as well as AET variability measures. Those results are compared to the Surface Energy Balance System (SEBS, an energy balance model which adopts satellite data and meteorological data) estimates for the study area for some days of the year 2010 to evaluate their respective likeliness. Furthermore, AET time series were used to identify periods of drought occurrence using the ratio AET to PET as drought indicator.

**Keywords**: Actual Evapotranspiration (AET), Bucket Bottom Hole (BBH), Surface Energy Balance (SEBS), drought monitoring, Medjerda basin.