Geophysical Research Abstracts
Vol. 18, EGU2016-14582, 2016
EGU General Assembly 2016

Climate and Hydrological Data Analysis for hydrological and solute transport modelling purposes in the Muriaé River basin, Atlantic Forest Biome, SE Brazil

Juliana Santos, Annika Künne, Sven Kralisch, Manfred Fink, and Alexander Brenning
Department of Geography, Friedrich Schiller University, Jena, Germany (juliana.santos@uni-jena.de)

The Muriaé River basin in SE Brazil has been experiencing an increasing pressure on water resources, due to the population growth of the Rio de Janeiro urban area connected with the growth of the industrial and agricultural sector. This leads to water scarcity, riverine forest degradation, soil erosion and water quality problems among other impacts. Additionally the region has been suffering with seasonal precipitation variations leading to extreme events such as droughts, floods and landslides.
Climate projections for the near future indicate a high inter-annual variability of rainfall with an increase in the frequency and intensity of heavy rainfall events combined with a statistically significant increase in the duration of dry periods and a reduced duration of wet periods. This may lead to increased soil erosion during the wet season, while the longer dry periods may reduce the vegetation cover, leaving the soil even more exposed and vulnerable to soil erosion.
In consequence, it is crucial to understand how climate affects the interaction between the timing of extreme rainfall events, hydrological processes, vegetation growth, soil cover and soil erosion. In this context, physically-based hydrological modelling can contribute to a better understanding of spatial-temporal process dynamics in the Earth's system and support Integrated Water Resourses Management (IWRM) and adaptation strategies.
The study area is the Muriaé river basin which has an area of approx. 8000 km^2 in Minas Gerais and Rio de Janeiro States. The basin is representative of a region of domain of hillslopes areas with the predominancy of pasture for livestock production.
This study will present some of the relevant analyses which have been carried out on data (climate and streamflow) prior to using them for hydrological modelling, including consistency checks, homogeneity, pattern and statistical analyses, or annual and seasonal trends detection. Several inconsistencies on the raw data were detected and excluded from the dataset. Statistically significant annual and seasonal trends have been detected such as an increasing trend for annual mean temperature, a decreasing trend for annual relative humidity and an increasing trend for precipitation during the wet season.
Moreover, the physically-based and fully distributed hydrological model JAMS/J2K-S has been applied and the spatial-temporal visualization of the climate data as well as an evaluation of spatial uncertainty will be presented.