



Characterization of the regional variability of flood regimes within the Omo-Gibe River Basin, Ethiopia

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Hydrological variability and seasonality is one of the Ethiopia's primary water resource management challenges. Variability is most obviously manifest in endemic, devastating droughts and floods. While the level of flooding is quite often extremely high and destroys human beings and property, in many cases flooding is of vital importance because the community benefits from flood recession agriculture. This is the case of the lower Omo plain whose agriculture is based on the regularity of the inundations due to flooding of the Omo Gibe River. The big flood in 2006, which caused death for more than 300 people and 2000 cattle, poses a dilemma. Flooding must be controlled and regulated in a way that the damages are reduced as much as possible but the flooding-related benefits are not lost. To this aim, characterization and understanding of hydrological variability of the Omo Gibe River basin is fundamental.

The goal of this work is to extract the maximal amount of information on the hydrological variability and specially on the flooding regime from the few data available in the region. Because most of the basin is ungauged, hydrological information is reconstructed using the data from 9 gauged catchments. A daily water balance model has been developed, calibrated and validated for 9 gauged catchments and, subsequently, the parameters have been correlated to catchment characteristics in order to establish a functional relationship that allows to apply the model to ungauged catchments. Daily streamflow has been predicted for 15 ungauged catchments, which are assumed to comprehensively represent the hydrological variability of the Omo-Gibe River Basin. Even though both northern and southern catchments are affected by a strong seasonality of precipitation, with most of the rain falling in less than 3 months, most of the northern catchments are humid, while in the southern part of the Omo-Gibe River basin, the catchments are either humid, dry sub humid, semiarid or arid. As for climate, also landscape and vegetation cover is more homogeneous in the northern part of the Omo Gibe River basin than in the southern part. Consequently, the runoff variability reflects the interesting diversity of climate and landscape of the basin. The gradient of flooding regimes from the north to the south of the Omo Gibe River basin will be analysed and the impacts of possible regime changes will be discussed.