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Lake Mar Chiquita (30°54'S-62°51'W) is a highly variable closed saline lake (≈ 6000 km^2) located at the west of the Parana-Plata Basin. It lies in the Pampean plains of central Argentina, an extensive area of mesic forests and grasslands. Its terminal position, collecting streamflows from a 37570 km2 catchment, induces a drastic response to hydro-climatic variations due to a cumulative effect. During the 70's important hydrological changes occurred in South America and the lake water-level rose dramatically. . Historical and instrumental data, combined with sedimentological, isotopic, and diatom analysis revealed that Mar Chiquita is an ideal site for recording high- and low-frequency changes in its hydrological budget. Therefore, this lake can be considered as a regional and temporal integrator of its catchment water balance. The lake response to climatic and environmental changes includes both rainfall-runoff processes occurring in the lake catchment, and the specific hydrological behaviour of the lake system which is rather linked to the order of magnitude of variation of each component.
The objectives of this work are to provide a quantified climatic interpretation of lake variations reconstructed for the last centuries and to determine mechanisms and magnitude of past changes. A mass balance model was used to assess Lake Mar Chiquita response (lake level and water salinity) to climatic and hydrological changes. The results of the model calibration over the 1967-2006 period revealed a significant contribution of the northern wetlands to the lake water balance. Sensitivity analyses were then performed to test the impact of different hydrological changes on a hypothetical equilibrium state: the response time is rapid (≈ 40 years) and lake level and salinity are particularly sensitive to abrupt dry events.
The preliminary results of a rainfall-runoff model, the Soil and Water Assessment Tool (SWAT, Arnold et al., 1998) are also presented. The SWAT model is used to simulate water balance in the lake's catchment. It is a continuous-time and spatially distributed simulator of the watershed-scale hydrology, particularly designed to calculate and route water flows in each individual drainage units (sub-basins).
Coupled with the lake model it will offer a unique opportunity to describe and predict climatic and human impacts on the hydrology of Lake Mar Chiquita basin.

Keywords: closed-saline lake, hydrological modelling, water balance model, lake level variation, catchment model, hydroclimate change, Argentinean Pampas.