
Application: Baro-Gambella River Basin, Ethiopia

Overview

The Baro River is a river in southwestern Ethiopia, which defines part of Ethiopia's border with South Sudan. From its source in the Ethiopian Highlands it flows west for 306 kilometres (190 mi) to join the Pibor River. The Baro-Pibor confluence marks the beginning of the Sobat River, a tributary of the White Nile.

The Baro and its tributaries drain a watershed 41,400 km² (16,000 sq mi) in size. The river's mean annual discharge at its mouth is 241 m³/s (8,510 ft³/s). During the rainy season, between June and October, the Baro River alone contributes about 10% of the Nile's water at Aswan, Egypt. In contrast, these rivers have very low flow during the dry season.[3]. Flood-retreat agriculture along major waterways uses the natural flood plain and seasonal inundation to regulate crop planting during the rainy season.

The PIHM simulation is for the upper Baro with outlet near the town of Gambella. The model output has a daily time steps for the period 2017. The weather or forcing data uses GLDAS at a resolution is 0.25 degrees. There are 1695 elements. The very complex drainage network is shown below. The simulation has significant errors that require calibration. The river segments selected were too fine and did not match the grid correctly, although the model did run successfully the results are not reliable. Figure 2 shows limited expected flooding during May 2017 (meters).

Figure 1. Baro domain, elevation and complex river network.

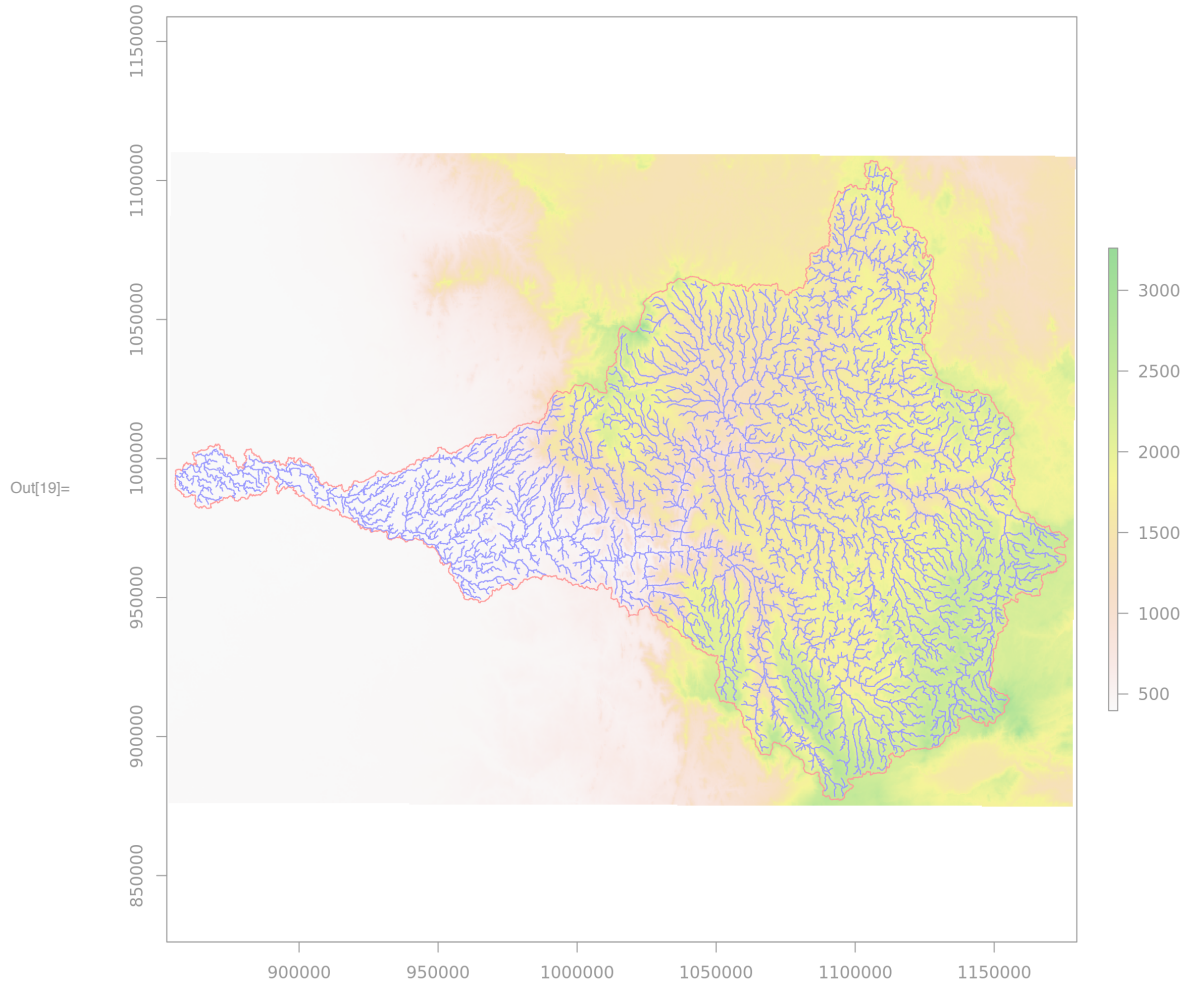


Figure 2. Expected flooding depth (m) for May 2017.

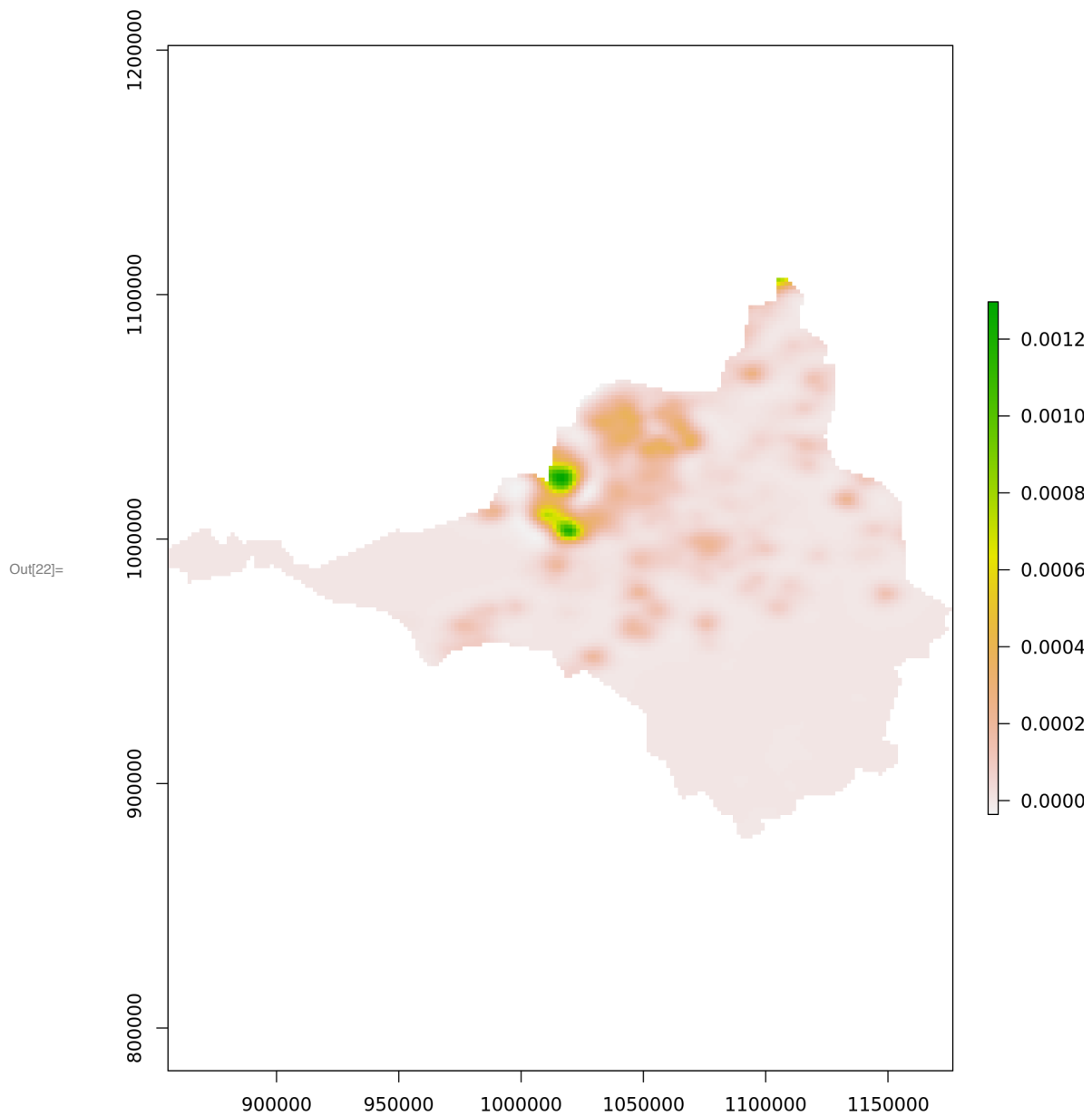


Figure 3. Spatially aggregated water balance for 2017, units are in m/day. ΔH is the change in total storage of water (m). The variables are: Precipitation-P, Potential Evapotranspiration-ETP, Discharge-Q, Canopy interception-ET-IC, Transpiration-ET-TR, Ground Evaporation-ET-EV.

