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Comparative Hydrology in Ethiopia: a learning experience

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Ethiopia is climatically and environmentally extremely heterogeneous. The highlands receive a lot of rainfall (more than 2000 mm/year) concentrated in only three months. Most of Ethiopian runoff is produced in these highlands (part of this water reaches the Mediterranean sea through the Nile river). Lowlands vary from forests to deserts. The hottest place on earth is there (the Danakil depression, more than 150 meters below see level). This makes the spatial and temporal variability of hydrologic signatures very strong in the country.

We present the results of a comparative hydrology exercise performed during a three-week Winter Research Workshop held in Addis Ababa during Christmas time this year. There, a new institution, the Ethiopian Institute of Water Resources (EIWR), and a new education program (18 PhD + 24 MSc) has been started less than one year ago. Instead of the traditional approach of education, based on lectures, reading and exercises, a learner-centered approach has been used: the students have been asked to collect available rainfall and runoff data, to interpret them by comparing and contrasting different catchments in the country, to develop conceptual models and use them to critically test ideas.

The R software has been used in the workshop for two reason: (1) its flexibility makes it an ideal language for learner-centered education, since students can easily define new functions and extensions and can autonomously develop and test their hypothesis; (2) it is open source, light and free of charge, which makes it particularly appealing in developing countries like Ethiopia.