



## **Energy balance measurements over a small reservoir in Ghana's Upper East Region**

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Near the small village of Binaba (10.778927 deg N, 0.464859 deg E), a small irrigation reservoir has been instrumented to measure different parts of the energy balance of this water body. Instruments were placed on, or attached to, a spar platform. This platform consisted of a long PVC pipe, the spar, which is closed at the bottom. On the PVC pipe rests an aluminum frame platform that carries instrumentation and solar power panel. In turn, the platform rests partially on a large inflated tire. At the bottom of the PVC pipe, lead weights and batteries were placed to ensure a very low point of gravity to minimize wave impact on the platform movement. The tire ensures a large second moment of the water plane. The combination of large second momentum of the water plane and small displacement, ensures a high placement of the metacenter. The distance between the point of gravity and the metacenter is relatively long and the weight is large due to the weights and batteries. This ensures that the eigenfrequency of the platform is very low.

On the platform, we fixed a WindMaster Pro (sonic anemometer for 3D wind speed and air temperature to perform eddy covariance measurements of sensible heat flux), a NR Lite (net radiometer), and air temperature and relative humidity sensors. Water temperature at different depths was measured with a string of TidbiT's (waterproof temperature sensors and loggers). The platform had a wind vane and the spar could turn freely around its anchor cable to ensure that the anemometer always faced upwind. A compass in the logger completed this setup.

First results suggest, as expected, that the sensible heat flux is relatively small with on average 20 W/m<sup>2</sup> over the course of a day. Sensible heat flux peaked around midnight at 35 W/m<sup>2</sup>, when the warm water warmed up the air from the colder surrounding land. The dynamics of heat storage during the daytime and longwave radiation during the night time, are important to calculate the latent heat flux.