

Seasonal variability of evapotranspiration in the Huancayo Observatory (Central Peruvian Andes) using eddy covariance techniques

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Evapotranspiration has a relevant role for the water balance and crop irrigation programs; however, its study in Peru is scarce. In this paper, we quantify the evapotranspiration using the eddy covariance technique in Huancayo Observatory (Central Peruvian Andes), in order to evaluate the daily and annual variability. We also compared the observed evapotranspiration with the empirical equations Penman-Monteith, Priestley-Taylor and Hargreaves to see which equation best fits with the observed data. The data comes from the krypton hygrometer and the sonic anemometer installed on the tower flux (TF) in the Observatory. Linear regressions method were used to evaluate which meteorological variable has more influence in the evapotranspiration process.

The average daily and accumulated evapotranspiration for the dry season (May-August) is 1.25 mm / day and 152 mm, respectively; and 3.17 mm/day and 383.3mm for the wet season (December to march). The fraction between evapotranspiration and precipitation is 0.78 for the wet season and 3.16 for the dry seasons. The evapotranspiration has good correlation with solar radiation for wet season ($r = 0.84$) and with soil moisture for dry season ($r = 0.88$), it suggest that during the wet season it does not depend on the amount of soil moisture but of energy available at the surface. The Penman-Monteith and Priestley-Taylor equations represent adequately the daily variability of evapotranspiration compared to evapotranspiration obtained by Eddy covariance technique, with high correlation coefficient ($r = 0.87$ and $r = 0.85$, respectively). The evapotranspiration in the Huancayo Observatory was greater than its expected for the mountain region during wet season, its comparable with the Amazon basin (3 mm/day).