Along the Cosumnes River in California’s Central Valley, a field study at two different riparian sites provides evapotranspiration estimates for use in hydrological and ecological studies. Biomicrometeorological measurements of riparian ecosystems presents a challenge because of the vegetation lies along a narrow band, limiting fetch required of many traditional biomicrometeorological methods.

We use eddy-covariance at the downstream site. At the upstream site, where fetch is very limited, we implemented an energy balance-infrared thermometry technique which is less sensitive to advective energy losses. We have been collecting data at the upstream site since July, 2003 and at the downstream site since February 2004.

30 sec. averages of aerodynamic resistances estimated at the upstream site by assuming that LE = 0 at night. The equation from this one, \( R_a = 45.37u^{-0.707} \) is almost identical to the equation we use to describe the aerodynamic resistance as a function of wind speed. It is interesting to note that the power to which the wind speed is raised (-0.7) is between what we would expect for a homogeneous canopy (-1) and an isolated object (-0.5).

At the upstream site we estimate the aerodynamic resistance using two different methods and use this estimation to then solve for latent energy (LE) as a residual in the energy balance. The first method is to solve for aerodynamic resistance when the canopy is wet and stomatal resistance is assumed negligible:

\[
R_a = \frac{\rho \cdot C_p \cdot (T_e - T_e^*)}{(R_n - G)}
\]

In the second method we solve for aerodynamic resistance at night and we assume LE is negligible.

\[
R_a = \frac{\rho \cdot C_p \cdot (T_e - T_e^*)}{(R_n - G)} + \frac{\epsilon (T_e - T_e^*)}{\gamma}
\]

This plot gives us an indication of how well the measured half-hour turbulent fluxes are accounting for the available energy. We are not accounting for storage in the canopy however. 0.71 (22% lack of closure) is typical for half-hour eddy-covariance measurements.