



Land-Atmosphere Exchange of Heat, Water Vapor, and CO₂ above a Mountainous Cypress Forest in Taiwan

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Results from 2-year measurements of sensible heat, water vapor, and CO₂ fluxes above a homogeneous mountainous Cypress forest are presented. The site is a natural-regenerated yellow cypress plantation on Chi-Lan Mountain, Taiwan. The forest area is 374 ha and covers an altitude range between 1650 and 2432 m a.s.l. and has a homogeneous slope of 15 degree. The weather is warm temperate. The fetch in the main wind directions was 1.8 km and the shortest fetch was 1.0 km. The average canopy height was 10.3 m.

Sensible heat, water vapor, and CO₂ fluxes were measured by an eddy-covariance system installed at 24 m height. Data were collected during the period of April 2005 to May 2007. Two gap filling methods, adopting strategies of Penman-Monteith equation and linear regression between net radiation and scalar fluxes, were investigated and then applied to fill the missing and rejected data. The seasonal patterns of sensible heat, latent heat, and CO₂ fluxes were examined. Bowen ration variation with season and relative transport efficiencies between heat and water vapor and carbon dioxide under different atmospheric stabilities were also discussed.