



Ecohydrological modeling describing energy, H_2O and CO_2 fluxes in alfalfa field: A comparison based on photosynthesis approach

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Two vegetation dynamic models (VDMs) coupled to a SVAT scheme for alfalfa ecosystem were examined. Both the coupled models are able to simulate soil moisture, CO_2 and water fluxes, as well as biomass, photosynthesis, surface temperatures, and other ecosystem variables. The models differ widely in simulating gross photosynthesis phenomenon: the former is adapted from a daily model, while the latter is a more complex model, needing the continuous monitoring of CO_2 concentration and a significantly higher number of parameters.

The performance of the two coupled models have been verified through ground energy fluxes measurements, recorded by a complete eddy covariance system, and the monitoring of the vegetation growth with a LAI analyzer. The measures were carried out during the summer periods of the years 2006-2008 in an alfalfa field placed in a Mediterranean area (southern Italy).

Finally, by means of a sensitivity analysis it is shown that the parameters related to soil hydraulic properties and plant growth result those more significant in the simulation of the physical processes.