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Hydrol. Earth Syst. Sci., 13, 1045-1059, 2009  
www.hydrol-earth-syst-sci.net/13/1045/2009/

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## Simulation of the soil water balance of wheat using daily weather forecast messages to estimate the reference evapotranspiration

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**Abstract.** Aiming at developing real time water balance modelling for irrigation scheduling, this study assesses the accuracy of using the reference evapotranspiration ( $ET_o$ ) estimated from daily weather forecast messages ( $ET_{o,WF}$ ) as model input. A previous study applied to eight locations in China (Cai et al., 2007) has shown the feasibility for estimating  $ET_{o,WF}$  with the FAO Penman-Monteith equation using daily forecasts of maximum and minimum temperature, cloudiness and wind speed. In this study, the global radiation is estimated from the difference between the forecasted maximum and minimum temperatures, the actual vapour pressure is estimated from the forecasted minimum temperature and the wind speed is obtained from converting the common wind scales into wind speed. The present application refers to a location in the North China Plain, Daxing, for the wheat crop seasons of 2005–2006 and 2006–2007. Results comparing  $ET_{o,WF}$  with  $ET_o$  computed with observed data ( $ET_{o,obs}$ ) have shown favourable goodness of fitting indicators and a RMSE of  $0.77 \text{ mm d}^{-1}$ .  $ET_o$  was underestimated in the first year and overestimated in the second. The water balance model ISAREG was calibrated with data from four treatments for the first season and validated with data of five treatments in the second season using observed weather data. The calibrated crop parameters were used in the simulations of the same treatments using  $ET_{o,WF}$  as model input. Errors in predicting the soil water content are small,  $0.010$  and  $0.012 \text{ m}^3 \text{ m}^{-3}$ , respectively for the first and second year. Other indicators also confirm the goodness of model predictions. It could be concluded that using  $ET_o$  computed from daily weather forecast messages provides for accurate model predictions and to use an irrigation scheduling model in real time.

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Citation: Cai, J. B., Liu, Y., Xu, D., Paredes, P., and Pereira, L. S.: Simulation of the soil water balance of wheat using daily weather forecast messages to estimate the reference evapotranspiration, Hydrol. Earth Syst. Sci., 13, 1045-1059, 2009. [Bibtex](#) [EndNote](#) [Reference Manager](#)

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