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Analysing surface hydrological processes in China simulated by a land-surface model

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Both Australia and China share many similarities in terms of their current climate characteristics and challenges as a result of anticipated future climate change. Drought and surface hydrological studies are key areas in both countries for improving our understanding of dominating regional climate processes. In this study, through an Australia-China climate change bilateral project, we have analyzed the Australian CSIRO Atmosphere Biosphere Land Exchange (CABLE) model 50-year offline simulations over China. In additional to the evaluation of model surface climatology, we have also compared soil moisture variations at a number locations in China against observations for the period of 1981 to 1991. Observations in its central-east region suggest a possible soil moisture recharge-discharge processes at seasonal time scale, with soil moisture being depleted during its early spring and recharged during summer monsoon wet seasons. It further suggests that soil moisture accumulated during its rainfall season can be retained for several months due to low evaporation demand in the winter months. Such a seasonal cycle is not well simulated in the model that predicts soil moisture varies with rainfall seasonal cycle very closely. On the other hand, reasonable agreement of soil moisture anomalies between observed and model-simulated is found in the analysis. Further analysis shows that model-simulated surface evaporation has significant trends in a number of regions in China, of which some are caused by the trend in rainfall forcing. While at a number of locations the model has simulated significant downward trends in surface evaporation but precipitation shows an upward trend. Such results are consistent with observed pan evapora-

tion variations reported in China as pan evaporation paradox. In this study, we have compared the model-simulated river discharges from Yellow River and Yangtze River basins in China against observations. River discharge is reasonably simulated in the Yellow River basin while it is underestimated in the Yangtze River although its variations are recaptured satisfactorily. Further model evaluation will be pursued using extensive observational network in arid and semi-arid regions in China.