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英文题目：Coupling the Common Land Model to the ECHAM5 Atmospheric General Circulation Model

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英文摘要：The ECHAM5 model is coupled to the widely used Common Land Model (CoLM). ECHAM5 is a state-of-the-art atmospheric general circulation model incorporated into the integrated weather and climate model of the Chinese Academy of Meteorological Science (CAMS-CSM). The land surface schemes in ECHAM5 are simple and do not give an adequate representation of the vegetation canopy and snow/frozen soil processes. Two AMIP-type experiments (ECHAM5 and ECHAM5–CoLM) are run over 30 years and the results are compared with reanalysis datasets and observational data. We found that the pattern of land surface temperature simulated by ECHAM5–CoLM is significantly improved relative to ECHAM5. Specifically, the cool bias over Eurasia is removed and the root-mean-square error is reduced in most regions. The seasonal variation in the zonal mean land surface temperature and the in situ soil temperature at 20 and 80 cm depth are both better simulated by ECHAM5–CoLM. ECHAM5–CoLM simulates a more reasonable spatial pattern in the soil moisture content, whereas ECHAM5 predicts much drier soils. The seasonal cycle of the soil moisture content from ECHAM5–CoLM is a better match to the observational data in six specific regions. ECHAM5–CoLM reproduces the observed spatial pattern of both the sensible heat flux and the latent heat flux. The strong positive bias in precipitation over land is reduced in ECHAM5–CoLM, especially on the southern Tibetan Plateau and the middle to lower reaches of the Yangtze River during the summer monsoon rainfall.

中文题目：通用陆面模式（CoLM）与大气模式 ECHAM5 的耦合研究

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将通用陆面模式 CoLM 耦合到了大气模式 ECHAM5。EHCAM5 是中国气象科学研究院天气-气候一体化模式 CAMS-CSM 的大气模式，但其陆面模式较为简单，不能满足高分辨率模拟的需要。利用再分析资料和观测资料检验耦合前后的 AMIP-type 试验结果发现：a）改进原模式欧亚大陆地表温度冷偏差的问题；b）改进了地表温度的季节变化特征；c）解决了原模式土壤湿度整体偏干的问题，新版本模拟的土壤湿度更接近再分析结果；d）土壤温度的季节变化特征也得到了一定程度的改善；e）感热、潜热的偏差、空间相关系数和均方根误差均小于老版本；f）对原模式中全球降水较大的正偏差有一定程度的减小，特别是东亚地区的夏季风的正偏差，有较为明显的减小。

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