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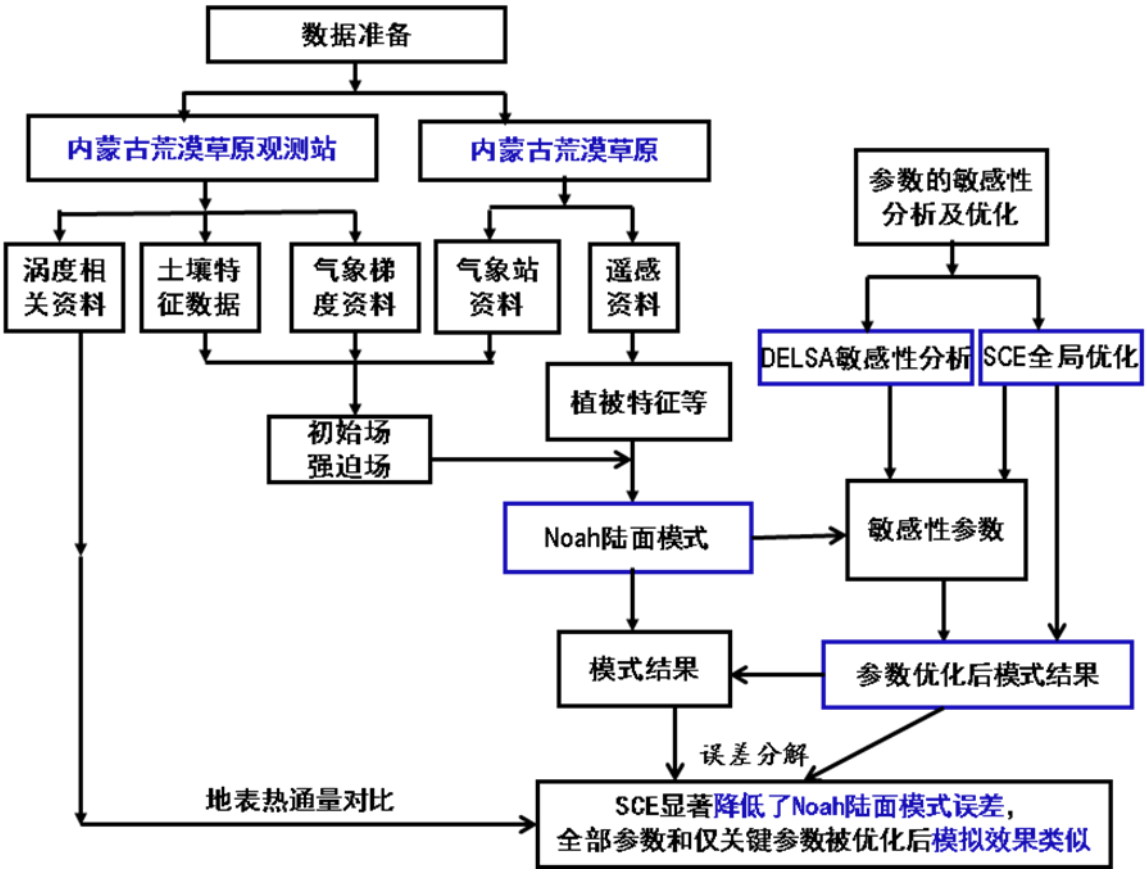
中文题目：Noah 陆面模式中地表热交换在中国温带荒漠草原的参数敏感性分析

作者：张果，周广胜*，陈飞

中文摘要：基于内蒙古荒漠草原站 2008 及 2009 年 5-9 月的地表热通量数据，运用局地敏感性分析方法研究了 Noah 陆面模式中参数对地表热通量的相对贡献，确定了 Noah 陆面模式在内蒙古温带荒漠草原站的关键参数，并利用全局参数优化方法（SCE）校正了 Noah 陆面模式，从而分析参数优化对地表热交换的影响。通过分析模拟结果的系统误差、非系统误差、均方根误差和平方根误差分解评估模式中 27 个参数和 12 个关键参数被校正时模式的模拟效果。研究发现，相较于控制实验，SCE 分别以净辐射、感热通量、潜热通量和土壤热通量为目标变量校正 Noah 陆面模式时，可以显著降低模式误差。Noah 模式中 27 个参数被校正和 12 个参数被校正时模式的模拟效果类似。最后，利用 2010 年 5-9 月的地表热通量观测数据，进一步验证了校正后的 Noah 陆面模式，发现校正后的 Noah 陆面模式在该站在时间上具有一定的可适用性。

文章结构框图：



英文题目：Analysis of Parameter Sensitivity on Surface Heat Exchange in the Noah Land Surface Model at a Temperate Desert Steppe Site in China

作者：ZHANG Guo, ZHOU Guangsheng*, CHEN Fei

英文摘要：The dominant parameters in the Noah land surface model (LSM) are identified, and the effects of parameter optimization on the surface heat exchange are investigated at a temperate desert steppe site during growing season in Inner Mongolia, China. The relative impacts of parameters on surface heat flux are examined by the distributed evaluation of local sensitivity analysis (DELSA), and the Noah LSM is calibrated by the global shuffled complex evolution (SCE) against the corresponding observations over the periods of May-September in 2008 and 2009. The differences in flux simulations are assessed between the Noah LSM calibrated by the SCE with 27 parameters and 12 dominant parameters. The systematic error, unsystematic error, root mean squared error and mean squared error decomposition are used to evaluate the model performance. Compared to the control experiment, parameter optimization by the SCE using net radiation, sensible heat flux, latent heat flux and ground heat flux as the objective criterion respectively, can obviously reduce the errors of the Noah LSM. The calibrated Noah LSM is further validated against flux observations of growing season in 2010 and it is found that the calibrated Noah can be applied in the longer term at this site. The Noah LSM with 12 dominant parameters calibrated performs similar to that with 27 parameters calibrated.