Assessment of Surface Exchange Coefficients in the Noah-MP Land Surface Model for Different Land Cover Types over China

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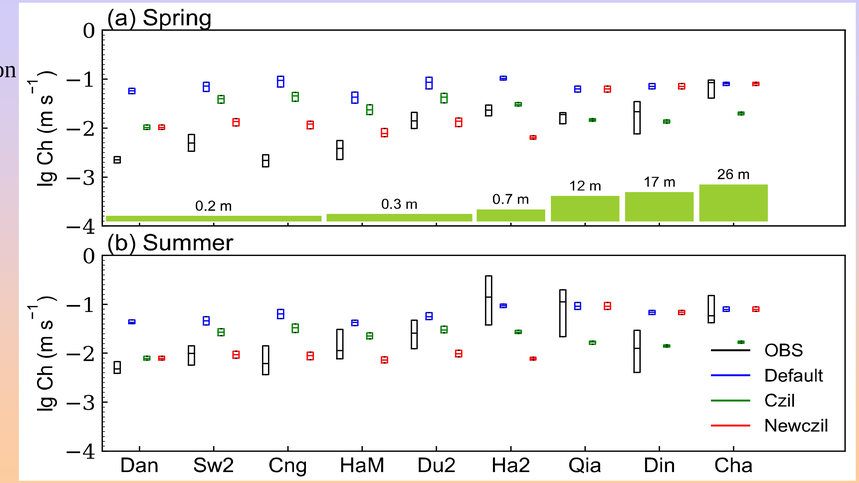
Background and objective

The parameterization of surface exchange coefficients (C_h) representing land–atmosphere coupling strength plays a key role in land surface modeling. Previous studies have found that land–atmosphere coupling in land surface models (LSMs) is overestimated, which affects the predictability of weather and climate evolution. To improve the representation of land–atmosphere interactions in LSMs, this study investigated the dynamic canopy-height-dependent coupling strength in the offline Noah LSM with multiparameterization options (Noah-MP) when applied to China.

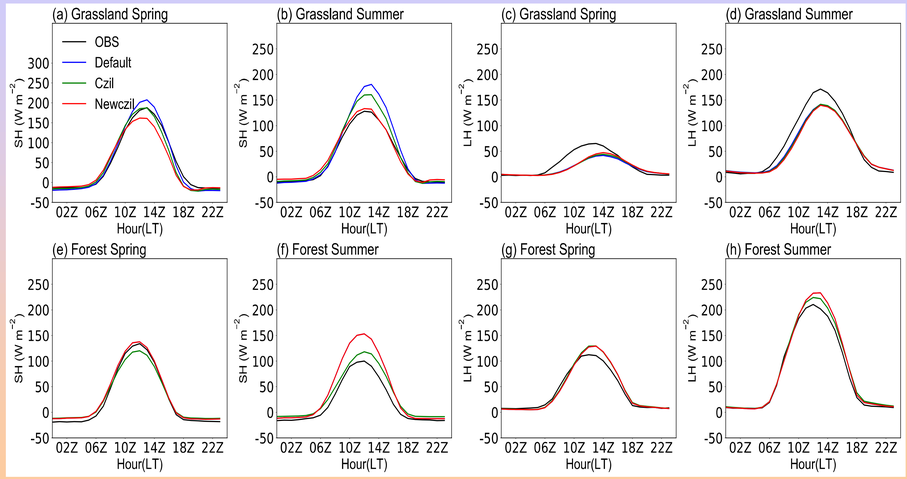
Key points

- Impacts of C_{zil} on coupling strength as well as surface energy and water components over China were simulated
- The dynamic canopy-height-dependent C_{zil} scheme was found superior in reproducing observations
- The dynamic scheme performed better for short vegetation because of the treatment of the roughness length for heat

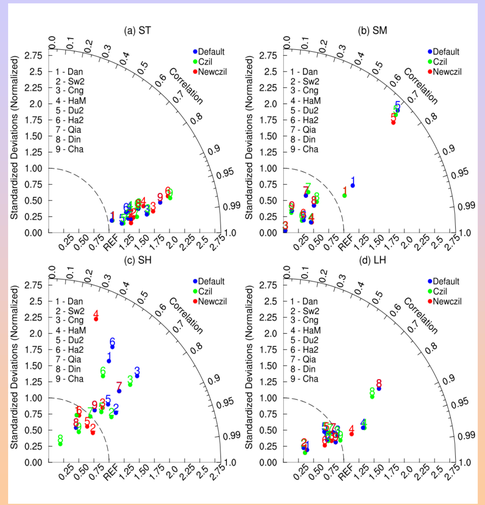
- **Default:** default M-O option (No- C_{zil})
- **Czil:** $C_{zil} = 0.1$
- **NEWCZIL:** $C_{zil} = 10^{(-0.4h)}$



C_h (plotted at log10 scale) at 9 ChinaFlux sites



Diurnal comparisons of sensible and latent heat flux



Statistics analysis between observations and simulations