Land Data Assimilation System

- An uncoupled land surface models that are forced primarily by observations are not affected by NWP forcing biases.
- Land data assimilation systems also have the ability to maximize the utility of limited land surface observations by propagating their information throughout the land system to unmeasured times and locations.

Korea Land Data Assimilation System

* Noah land surface model V.2.5.2
* WRF WPS-based land surface variables
* MODIS-based land surface variables
  a) Land cover
  - MOD12C1 IGBP type → KLDAS USGS type with Enhanced Vegetation
  b) Vegetation Fraction
    - Generation of monthly VF using MOD1C2 EVI
  c) Leaf Area Index (MODIS_1B_v6)
  - Change from the fixed value to monthly dynamics
* KLDAS input forcing data
  a) Model-based near-surface meteorological conditions
    + 6 hourly 0.5625° Global Data Assimilation and Prediction System (GDAPS) analysis fields of KMA
    + Bilinear interpolation from GDAPS grid to KLDAS domain
  b) Observation-based meteorological conditions
    1) Downward Shortwave radiation
    2) Precipitation

OLD

NEW

KLDAS database
The data are in 10 km resolution grid spacing and range from 01 Jan 2004 to 12 Dec 2008 for input forcing and from 01 Jan 2006 to Dec 2008 for output data. KLDAS forcing data can be downloaded from Yonsei LAMOR file server. contact point: Yoonjin Lim (ylim@yonsei.ac.kr or yoonjin_lim@nims.re.kr)

<table>
<thead>
<tr>
<th>Variables</th>
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GTS accumulated precipitation & AWS hourly precipitation, and cloud fraction using MODIS-1TAR

| Variables | CTL | KLDAS |
|-------------------------|
| Input forcing for land-surface modeling |
| Surface temperature |
| Surface pressure |
| Wind speed |
| Relative humidity |
| Downward solar radiation |
| Precipitation |
| Output |
| Fluxes (sensible, latent, ground soil) |
| Soil moisture, soil temperature |
| Evapotranspiration, runoff |

Verification

Output Late Latent heat flux, Sensible heat flux, Evapotranspiration

Comparison to GLDAS

Evapotranspiration trend

Evapotranspiration trend (precipitation over years)

Summary

* The Korea Land Data Assimilation System has been constructed to produce an accurate initial land surface condition for NWP model over East Asia.
* We have generated a 5-year, 10km, hourly atmospheric forcing dataset for use in KLDAS operating across East Asia.
* The KLDAS has effectively reproduced the observed patterns of soil moisture, soil temperature, and surface fluxes
* The numerical simulation incorporating the KLDAS outputs showed better agreement in both simulated near-surface conditions and simulated rainfall distribution, compared to those without the KLDAS over the Korean Peninsula

References

Li, Z., Z. Li, C. Weng, and J. Kong, 2007: Estimation of 13 flux absorbed at the surface from Tsada reflectance. J. Climat. 20, 337-353

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