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Current NCEP Operational NLDAS-2 Status, NCEP LDAS (NLDAS-3) and Beyond

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Current NLDAS-2 status



WHERE AMERICA'S CLIMATE AND WEATHER SERVICES BEGIN

NCEP Products Inventory

North American Land Data Assimilation Systems (NLDAS) Products

Updated: 08/05/2014

- Information about the NLDAS models
- Additional NLDAS documentation

fh is the forecast hour (i.e. 00, 01, 02, ..., 23)
 Click on the links under **Inventory** to see the file's contents.

NLDAS is only run for the 12Z cycle
 Note: The "NLDAS" domain contains the CONUS region, the northern part of Canada, and southern part of Mexico.

[NCEP realtime \(grib2 format\)](#)

<ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/nldas/prod/>

[NCEP/EMC archive \(grib2 format\)](#)

ftp://ldas.ncep.noaa.gov/nldas2/nco_nldas/

[NASA DISC website \(grib1 format\)](#)

<http://disc.sci.gsfc.nasa.gov/hydrology/data-holdings>

DESCRIPTION	NCEP FTP SERVER File Name	NWS FTP SERVER File Name
NLDAS-2 model forcing - Surface level /8 degree NLDAS domain Filename nldas.t12z.force-a.grb2fh Inventory FH 00-23	Available in GRIB2 via FTP Available in GRIB2 via HTTP nldas.t12z.force-a.grb2fh	Not Available
NLDAS-2 model forcing - Hybrid level /8 degree NLDAS domain Filename nldas.t12z.force-b.grb2fh Inventory FH 00-23	Available in GRIB2 via FTP Available in GRIB2 via HTTP nldas.t12z.force-b.grb2fh	Not Available
NLDAS-2 NOAH model /8 degree NLDAS domain Filename noah.t12z.grb2fh Inventory FH 00-23	Available in GRIB2 via FTP Available in GRIB2 via HTTP noah.t12z.grb2fh	Not Available
NLDAS-2 Streamflow data from NOAH model		

NCEP NCO is running NLDAS-2 system in operational mode to provide timely-needed products for public users, in particular for operational purpose.

NCEP Land Data Assimilation System (NLDAS-3)

Domain: North American Model (NAM) – land part only

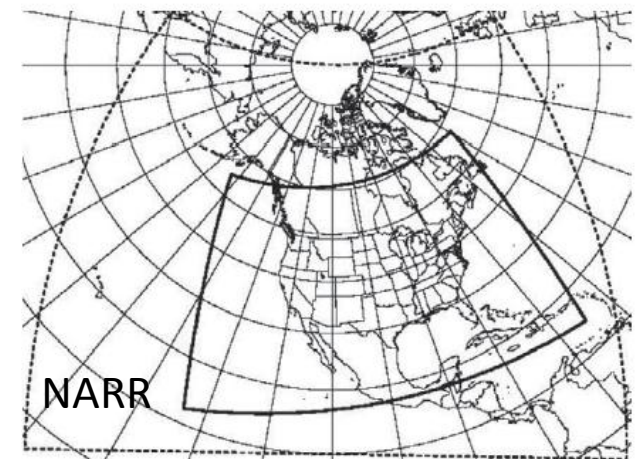
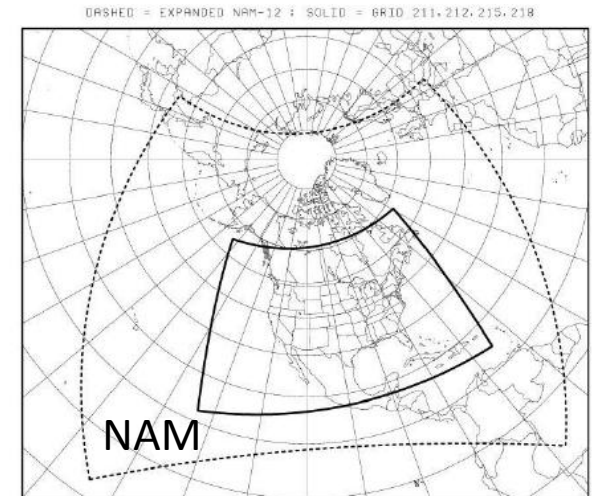
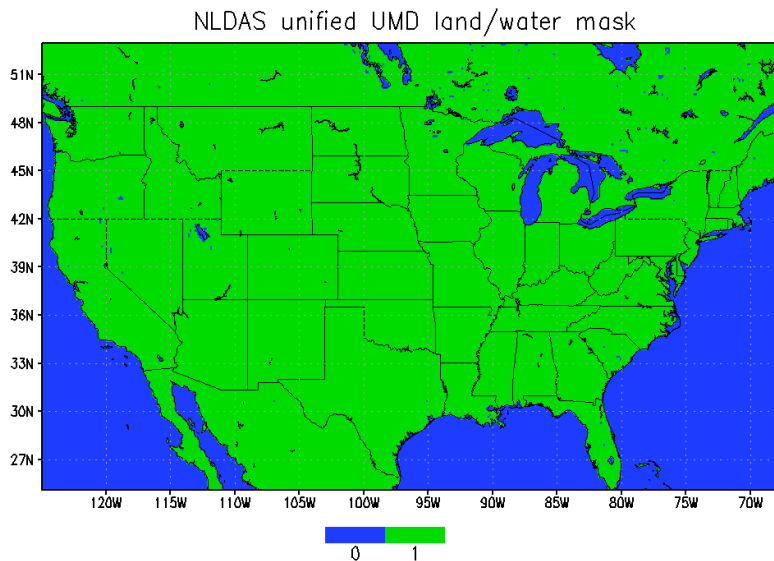
Spatial resolution: lat/lon – 0.04 degree

Temporal resolution: hourly

Time period: 1 January 1979 –current

Time lag: actual realtime

NLDAS-2 Domain



How to select exact NLDAS-3 domain with lat and lon?

FIG. 5. Verification domain (heavy solid line) used to obtain the verification results in Figs. 6–9, in comparison with the NARR domain (dashed line).

Mesinger et al., 2006

NLDAS-3 Forcing Generation

a. Retrospective Forcing

NARR domain

- (1) Extend operational NLDAS-2 Forcing algorithm to NARR domain
- (2) Modified codes generate 0.04 degree spatial resolution

Outside of NARR domain

Using GLDAS forcing to downscale to 0.04 degree spatial resolution

Boundary continuity – using GLDAS latitude dependent smooth algorithm

b. Realtime Forcing

NAM forcing (12 km) for the last 3 days was downscaled to 0.04 degree for whole NLDAS-2 domain

Issues: temporal inconsistency.

Like GLDAS, two cycles will be run: one is realtime, the other one is catchup

Land Surface Models Used in NLDAS-3

LIS-based Framework

Noah3.6, Catchment, SAC-HTET, and VIC4.1.2

Actual data assimilation is not included

Purpose of NLDAS-3

1. Support operational NA drought monitoring and forecast task for fine resolution
2. Used NLDAS-2 state variables (e.g., soil moisture, soil temperature) as NAM ICs, to support NAM forecast task

Advantage from NLDAS-2

1. Larger domain
2. Fine spatial resolution
3. Actual realtime without any lag
4. LIS-base framework with upgraded LSM models

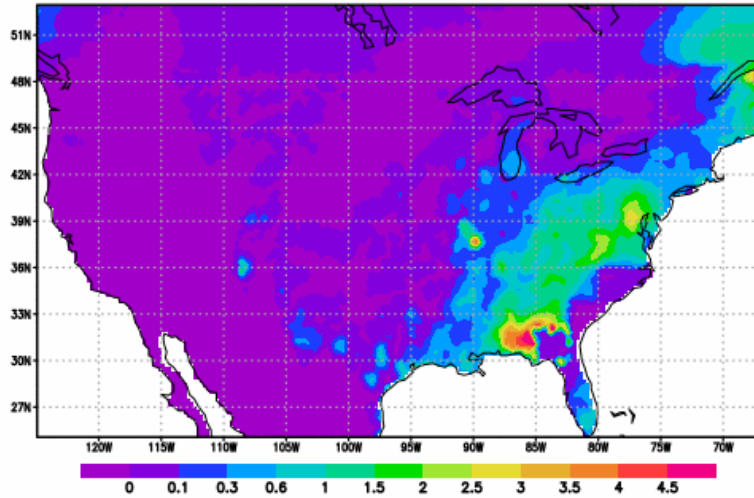
NLDAS-3 Beyond

Improve forcing generation process and accuracies, add actual data assimilation, add CLM, Noah-MP, JULES, and CABLE to NLDAS model suite

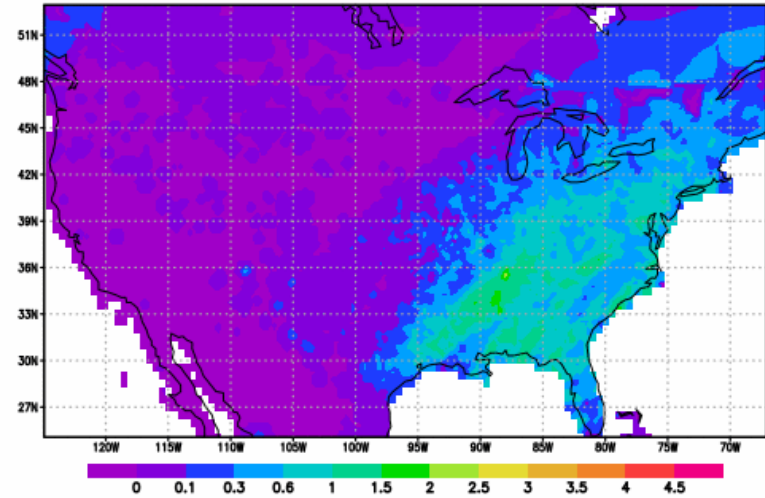
- Test the latest LIS to be used as a fully functional modeling framework for the NLDAS
- Integrate distributed cell-2-cell based flow routing along with source-to-sink routing for more accurate and faster river flow forecasts
- Integrate higher quality precipitation product into LDAS and implement algorithms to use optimally merged precipitation from multiple sources
- Evaluation and verification of currently developed tools (e.g. precipitation downscaling and gap-filling algorithms) for possible integration into the operational NLDAS

Comparison with NLDAS

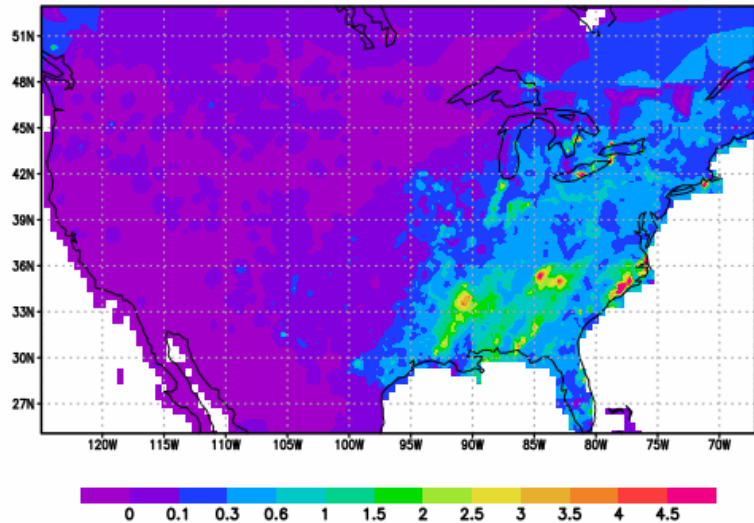
NLDAS (0.25)



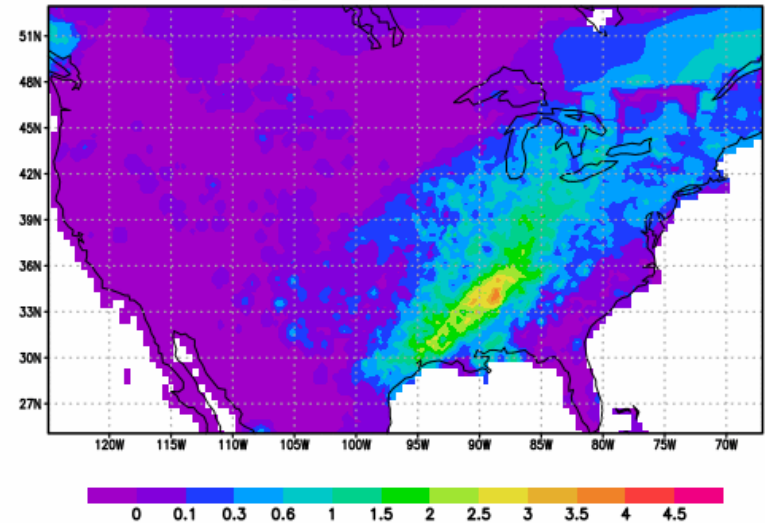
Downscaled (simple) (0.25)



Downscaled (new) (0.25)



CPC_OLR (0.25) time= 14



NLDAS: Future

Post-operational implementation of NLDAS drought monitoring over CONUS

- Run NLDAS under NASA Land Information System (parallel environment, latest land model versions, land data assimilation and validation tools).
- NLDAS seasonal hydrological prediction using VIC land model with CFS/other seasonal climate forcing.
- Improve atmospheric and observational precipitation forcing; data sets (e.g. land use, soils, greenness).
- Improve land model physics (e.g. Noah land model).
- Land data assimilation of e.g. snow, soil moisture.
- Higher res/downscaling, enhance land model spinup.
- Extend NLDAS domain (entire North America, eventually global); initial land cond. for NAM, GFS. 8