

Notes 2025-02-17

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Tasks this week

Try SMAP-HB postprocessing with RAPID

Finish organizing and splitting data into tiles and save as zarr

Watch the tutorial Luiz shared

Fix GDAL issue and run original WPS tutorial (with tutorial-specific static data and old software)

Try SMAP-HB postprocessing with RAPID

- First try Zenodo wget again
- If that fails, try the data I already uploaded
- Upload the version of the mapping.yaml I made and the functions and hru2grid file I used most recently, based on Noemi's updated functions

- Try to make a libraries folder in workspace so it doesn't get deleted every time I start a new instance

Problems

- Workload I was using before isn't starting as quickly as expected
- Try making a new one - stopped after waiting 1 hr 30 mins
- Connected to VPN, but maybe not working somehow

Problems

- Tried running what had worked before in terms of environment and functions and it didn't do anything, just stayed at start
- Data loss, not sure how but lost the most updated functions script so redid it
- DEM - when reprojecting, `spatil_ref` saved as variable instead of dimension - fixed, but not sure how

Code changes

- Changed functions so that if files already exist, they're overwritten - could change or make it so that you name the files something else if they already exist
- Fix DEM reprojection script to ensure crs is set
- Decided to use an environment similar to the one that works with the current software and add some libraries for plotting; `geopandas`, `matplotlib`, `pyproj`, `rasterio`
- Refactored `get_bbox`, `dem_acquisition`

Tried to delete geospatial env that wasn't working, but got this type of error a few times:

`ClobberError: The package 'conda-forge/win-64::matplotlib-base-3.10.0-py312h900a' path collision for 'lib/site-packages/matplotlib/mpl-data/fonts/ttf/dejavusans.. This path already exists in the target prefix, and it won't be removed by an uninstall action in this transaction. The path is one that conda doesn't recognize. It may have been created by another package manager.`

Finish organizing and splitting data into tiles and save as zarr

- Create a geospatial environment yaml for reproducibility

Static data: DEM, ICLUS one-hot encoded land use types, POLARIS properties

- Coordinate information: all reprojected to match SMAP-HB 30 m
- Ensure that coordinates are lon and lat, from -96.2 to -95.2 for lon and 29.5 to 30.5 for lat
 - Which should correspond to 3600 x 3600 pixels
- For now, include all POLARIS properties - probably won't want to include all in model

Temporal data: SMAP-HB 30 m, SMAP-HB 10 km, IMERG 10 km

- Coordinate info: figure out how to save both 30 m and 10 km data in the same xarray

- I think this can be done easily if I just name the lat and lons for each of them differently (lat10km, lon10km and lat30m, lon30m) (I can probably leave time the same for both since the values will match) and then combine them as one dataset, `xr.Dataset("SMAPHB_30m" : smap_30m, "SMAPHB_10km" : smap_10km)`
- Same process with IMERG

Try do rerun the scripts on RAPID to verify reproducibility

Fix MRMS cropping and processing

- Same as with DEM, `spatial_ref` saved as variable instead of coordinate; also, precipitation saved with variable name "unknown"
- Confirm: in inches?

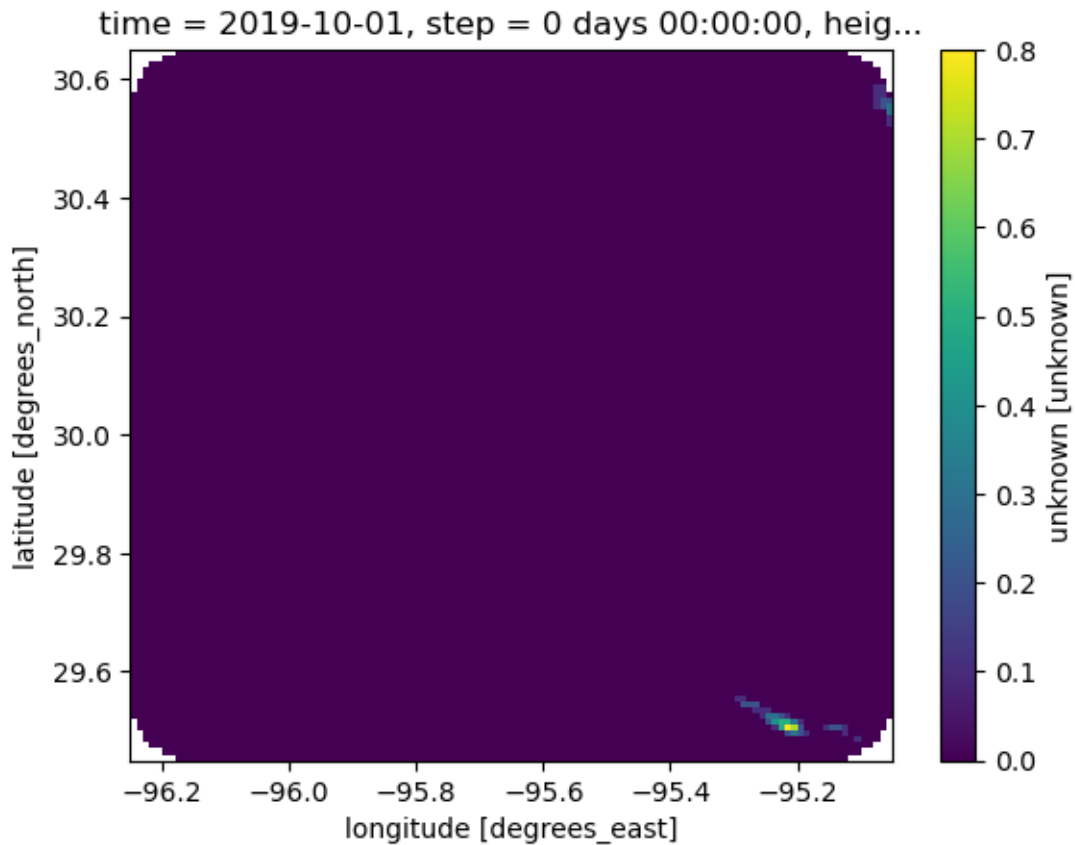


Figure 1: Cropped MRMS example

Model domain

- From 5.2.0 technical description - not sure if 5.3.0 has a separate one

- create geo_em.d0x.nc with GEOGRID utility; interpolates terrain, soils, and vegetation from standard products (static data)

Initial land surface conditions

- Includes soil moisture, soil temperature, snow states, others
- wrfinput_d0x.nc: created by real.exe or create_Wrfinput.R
- real.exe allows use of reanalysis products, whereas R script creates simplified uniform conditions based on geo_em.d0x.nc

Hydrologic routing input files

- geo_em.d0x.nc + hydrologically conditioned DEM are the minimum requirements to create terrain routing Fulldom_hires.nc and channel routing files
- Lake and reservoir input files require separate

WRF-Hydro GIS Preprocessing Toolkit

- Luiz tutorial

Fix GDAL issue and run original WPS tutorial (with tutorial-specific static data and old software)

- Pull a clean version
- Data that are missing: example_case folder, lessons, wrf_hydro_model_tools (preprocessing toolbox), WRF hydro

[lessons](#)

[Croton example case](#)

[model tools](#) - just links to [GitHub](#)

[WRF Hydro v5.1.1](#)

- Locate them, save links, and use a bind-mount

Original WPS tutorial

- HGT_M was generated properly

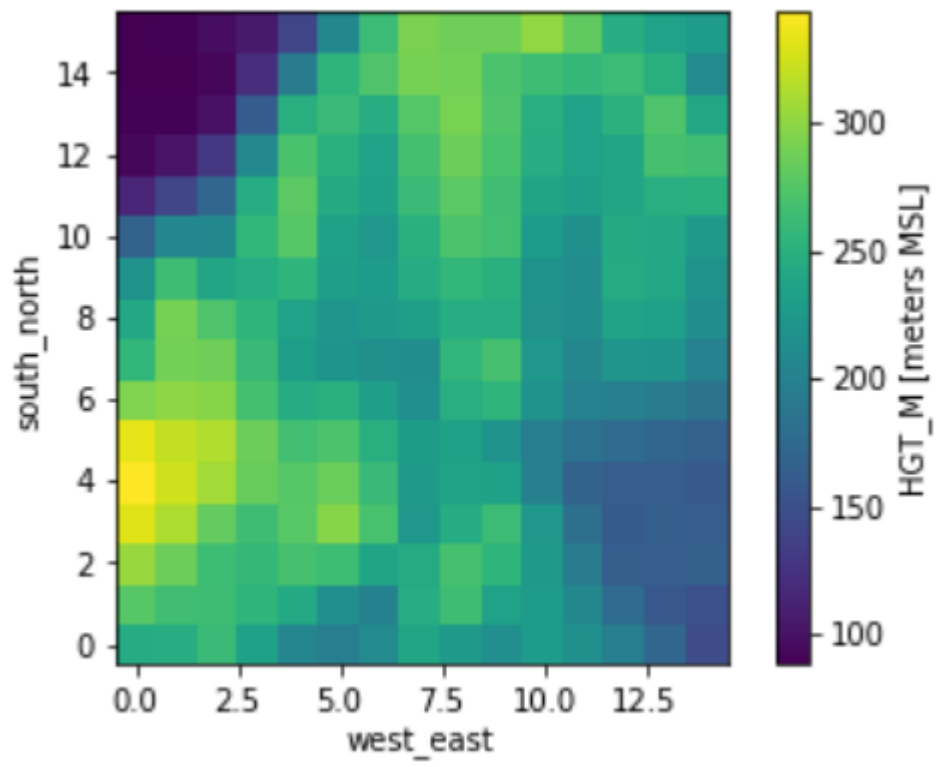


Figure 2: HGT_M plot from lesson 1

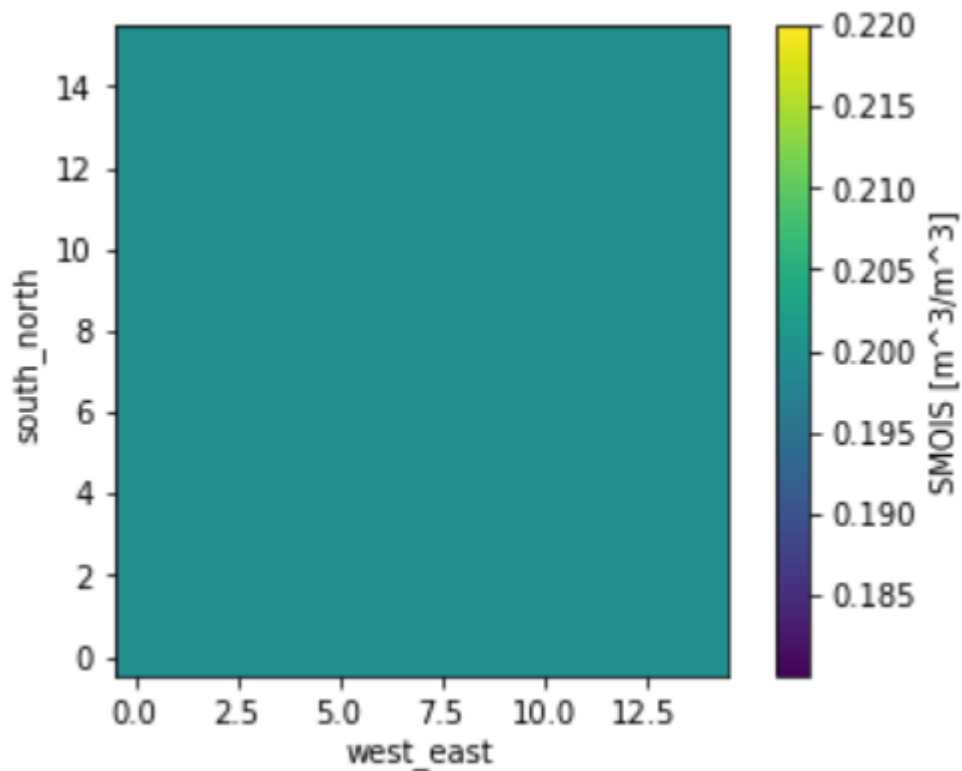


Figure 3: SMOIS plot from lesson 1

Problems

- Unzipping WRF Hydro 5.1.1 (example case version): restart file contains a colon, so can't unzip
 - Don't get this problem when using 7zip
 - But replace the colon with an underscore so it doesn't cause issues in the JupyterLab

Problems

```
cd ~/wrf-hydro-training/lesson-wps
cp ~/mount/wrf_hydro_model_tools/parameters/create_soilproperties/*.R .
cp ~/mount/wrf_hydro_nwm_public-5.1.1/trunk/NDHMS/Land_models/NoahMP/run/*TBL .      cp
~/mount/wrf_hydro_nwm_public-5.1.1/trunk/NDHMS/template/HYDRO/*TBL .
Rscript create_soilproperties.R
```

Error message:

Error in scan(file, what, nmax, sep, dec, quote, skip, nlines, na.strings, : line 95 did not have 28 elements Calls: read.table -> scan Execution halted

Solution:

- First, replace updatd version of create_soilproperties with [version for v5.1.1](#); doesn't fix problem
- Errors encountered initially
- Barebones Dockerfile to start from a completely clean backup of the container

MRMS data

- Clipping to match modified study domain
- Needed to redownload cfgrib
- Same issue where spatial_ref is saved as a variable after reprojecting
- I think this is resolved when you use the names “lat” and “lon” instead of “latitude” and “longitude”

Notes

Next week

- Zarr files
- Finish original WPS tutorial
- If too hard, store static and temporal data separately
- Get ArcMap and try to do the preprocessing for our study domain
- Try to do Luiz’s tutorial with whatever data they use
- Question: 5.1.1 vs 5.3.0