Use of New Precipitation File Formats in Common GIS Software

1. **ArcMap**
    a. NetCDF: Can drag/drop NetCDF files directly from a Windows folder into ArcMap Table of Contents.

    b. GeoTIFF: Surf to the file in the Catalog. Expand the the dataset to see Bands 1-4. 1=obs, 2=PRISM Normal, 3=Departure from Normal, 4=Percent of Normal.

2. **QGIS**
    a. Setting the AHPS Projection: The AHPS file does not contain an EPSG compliant coordinate reference system, so the user must add the definition of the coordinate system into the QGIS system. Select the "Custom CRS" tool from the "Settings" pull-down menu. Click the "+" button to define a new CRS. Input a descriptive name in the 'Name' field and enter the following into the 'Parameters' field:

    ```
    +proj=stere +lat_0=90 +lat_ts=60 +lon_0=-105 +x_0=0 +y_0=0
    +a=6371200 +b=6371200 +units=m +no_defs
    ```

    Click OK and the CRS will be added to your list of definitions and imported AHPS rasters should use this CRS.

    b. NetCDF: Can drag/drop NetCDF files directly from a Windows folder into the QGIS map document workspace. Select the desired layer name to complete the import process.

    c. GeoTIFF: Most QGIS configurations default to assuming multi-band geoTIFF images are RGB and will display bands 1/2/3 as an RGB image. Once loaded into the Table of Contents, double-click the raster name to open the raster properties dialog. Change the render type from "Multiband color" to "Singleband gray". Choose which band you need (1=obs, 2=PRISM Normal, 3=Departure from Normal, 4=Percent of Normal). Expand the "Load min/max values" dialog and select either "Cumulative count cut" or "Min/Max". Change the "Contrast enhancement" value to "Stretch to MinMax".

3. **GRASS**
    a. NetCDF: Import netCDF into your mapset using the r.in.gdal command. You will have to specify the layer needed. First point the "Source input" option to your netCDF. Then insert "NETCDF:" immediately before the file location and ":Layer_Name" after the file location where layer name is one of the following:
    observation, normal, departure_from_normal, percent_of_normal. The "Source input" option should look like:

    ```
    NETCDF:C:\Users\user.name\AHPS\nws_precip_last7days_201706
    ```

```
14_conus.nc:observation
```

b. GeoTIFF: Import raster into your mapset using the r.import command.

4. SAGA

a. NetCDF: Select the Geoprocessing pulldown menu, select File, then Grid, then import NetCDF. NetCDF layers will be available in the Data Management tab identified by their layer number and layer name.

b. GeoTIFF: Same process as NetCDF except the last selection will be “import raster”. Raster layers will be imported individually with the Band Number appended to the name in the Data Management tab.

5. NOAA's Weather and Climate Toolkit (https://www.ncdc.noaa.gov/wct/)

a. NetCDF: Fully supported.

b. GeoTIFF: Fully supported. Expand the the dataset to see Bands 1-4. 1=obs, 2=PRISM Normal, 3=Departure from Normal, 4=Percent of Normal.