NPJ Phase Diagram File System Structure

1) **Web Server:**
   a. **/realtime** → contains .php files for displaying the web interface
      i. **/images** → contains real time NPJ phase diagram final forecast and verification images produced for the present day
         1. **/image_archive** → contains final NPJ phase diagram forecast images within the 10-day forecast and verification archives
         2. **/alldays_images** → contains final images for NPJ regime composites
         3. **/warmevents_erock_images** → contains final images for East. U.S. extreme warm event composites
         4. **/warmevents_wrock_images** → contains final images for West. U.S. extreme warm event composites
         5. **/coldevents_erock_images** → contains final images for East. U.S. extreme cold event composites
         6. **/coldevents_wrock_images** → contains final images for West. U.S. extreme cold event composites
         7. **/prcpevents_erock_images** → contains final images for East. U.S. extreme precipitation event composites
         8. **/prcpevents_wrock_images** → contains final images for West U.S. extreme precipitation event composites

2) **Local File System**
   a. **/wpc_npj_files** → contains all the scripts and climatology files necessary to produce the NPJ phase diagram forecasts (more details on these specific scripts are found at the end of this document)
   b. **/realtime** → top level directory that holds products produced by the NPJ phase diagram scripts
      i. **/images**
         1. **/phase_diagrams** → contains NPJ phase diagram forecasts and verified NPJ phase diagrams for today
         2. **/old_phase_diagrams** → contains old NPJ phase diagram forecasts and verified NPJ phase diagrams
         3. **/jet** → contains GEFS mean and GFS synoptic maps of 250-hPa wind speed and height.
         4. **/temp** → contains GEFS mean and GFS synoptic maps of 850-hPa temperature, MSLP, and 1000–500-hPa thickness

5. **/precip** → contains GEFS mean and GFS synoptic maps of 24-h accumulated precipitation
6. **/vort** → contains GEFS mean and GFS synoptic maps of 500-hPa height and relative vorticity
   ii. **/verification** → contains the PCs for the GFS NPJ phase diagram forecast, the GEFS mean NPJ phase diagram forecast, and for each GEFS ensemble member NPJ phase diagram forecast. Also contains verification statistic files for the NPJ phase diagram forecasts
   iii. **/rawfiles** → contains netCDF files of 250-hPa zonal wind forecasts for each GEFS ensemble member and the GFS over the past 10 days

NPJ Phase Diagram Scripts and Climatology Files
These files are all located in /wpc_npj_files, where scripts will be executed

(a) Scripts:
jet_phasespace_RT_WPC.csh → Master script that downloads grib data and creates final NPJ phase diagram forecasts. This will be set up as a cronjob.

grib2nc_wpc.ncl → NCL script that takes downloaded grib data and concatenates it into a netCDF file

grib2nc_ens_wpc.ncl → NCL script that takes downloaded GEFS grib data and concatenates it into a single netCDF file for each ensemble member

eof_phasespace_RT.py → Python script that calculates and creates NPJ phase diagram forecasts for today

phasespace_verify.py → Python script that verifies the NPJ phase diagram forecast from 9 days ago and outputs verification statistics/verified NPJ phase diagram images

std_anom_gempak.py → Python script that calculates standardized anomalies of geopotential height and temperature at all isobaric levels from the CFSR during the forecast period for plotting purposes

synoptic_wpc.csh → Master script that creates synoptic maps and concatenates them with the appropriate NPJ phase diagram forecast. This master script contains the following scripts:

250hPa_jet_forecastGFS.csh → Plots 250-hPa height and wind speed from the GFS forecast using GEMPAK

250hPa_jet_forecacstGEFS.csh → Plots 250-hPa height and wind speed from the GEFS mean forecast using GEMPAK

500hPa_forecastGFS.csh → Plots 500-hPa height and relative vorticity from the GFS forecast using GEMPAK

500hPa_forecastGEFS.csh → Plots 500-hPa height and relative vorticity from the GEFS mean forecast using GEMPAK

precip_forecastGFS.csh → Plots 24-h accumulated precipitation from the GFS forecast using GEMPAK

precip_forecastGEFS.csh → Plots 24-h accumulated precipitation from the GEFS mean forecast using GEMPAK

sfcT_forecastGFS.csh → Plots 850-hPa temperature, MSLP, and 1000–500 hPa thickness from the GFS forecast using GEMPAK

sfcT_forecastGEFS.csh → Plots 850-hPa temperature, MSLP, and 1000–500 hPa thickness from the GEFS mean forecast using GEMPAK

dprogdt_NPJPD.csh → Constructs d(prog)/dt products relevant to today's NPJ phase diagram forecast

verification_NPJPD.csh → Constructs images for the verified NPJ phase diagram forecasts from 9 days ago

jet_phasespace_RT_WPC_patch.csh → This script is to be used (1) if today's NPJ phase diagrams are **not** produced by eof_phasespace_RT.py and (2) if synoptic maps are still constructed for today's forecast. See instructions at the top of the script to ensure proper use.

NPJPD_patch.csh → Run this script after jet_phasespace_RT_WPC_patch.csh to stitch existing synoptic maps with today's NPJ phase diagrams once they are correctly produced. See instructions at the top of the script to ensure proper use.

verification_stats_new.py → This script calculates and plots statistics relevant to the performance of the NPJ phase diagram forecasts. Products include:

Reliability diagrams

GEFS probability of detection within the NPJ phase diagram

Average GFS forecast error

Average GEFS ensemble mean error

Average GEFS ensemble member error

Time series of GFS and GEFS mean error by forecast lead time

False alarm ratio for GEFS ensemble mean forecasts of the NPJ regime

mkgdfl_BTH_inRT, mkgdfl_BTH.exe, mkgdfl_BTH.f → Files necessary for producing a GEMPAK file containing the relevant standardized anomaly data for today's forecast period

(b) Climatology Files:

250uwnd_eof_9mo1deg.out → Text file containing the EOF patterns for 250-hPa zonal wind over the North Pacific

uwndJan.out, et al. → Text file containing 250-hPa mean zonal wind data for each analysis time during the month of January (1 file for each month and the leap day)

Not included: Climatological height and temperature netCDF files from the CFSR

(c) Verification Statistic Files (deposited into: /realtime/verification on local file system)**:**

avedist_gefs.out → Average GEFS ensemble member PC error listed in order of increasing forecast lead time. The first element in each row identifies the NPJ regime in this and all subsequent text files listed below. Each row shows the PC errors for a unique forecast verified on a particular day (for an entire non-leap year cold season, this file should have 273 rows)

dist_gfs.out → Same as above but for the GFS deterministic forecast errors

dist_gefsmean.out → Same as above but for the GEFS mean forecast errors

pod.out → Same as above but for the GEFS ensemble probability of NPJ detection. A "1" indicates a successful detection of the NPJ at a particular forecast lead time

D#probct.out → Contains the number of grid points within the NPJ phase diagram characterized by a set probability of experiencing the NPJ at a particular forecast lead time. This file is used in calculating the reliability diagram

D#probhit.out → Contains the number of grid points within the NPJ phase diagram at each probability level characterized by a "hit" within the NPJ phase diagram for each forecast lead time. This file is used in calculating the reliability diagram.

D#fcastreg_gfs.out → Identifies the NPJ regime forecasted by the GFS at a particular forecast lead time

D#fcastreg_gefs.out → Same as above but for the GEFS mean forecast

D#verifreg.out → Same as above but for the verified NPJ regime at a particular forecast lead time