Description of VERA ensemble file format

VERA Data are saved in ASCII format on a Cartesian grid. The first 46 lines are the header and contain some necessary information for users (the important lines are painted yellow). Following the header the analysed field starts organized in 19 columns starting at the SW corner of the domain increasing to the north. The VERA ensemble domain is smaller than the original VERA-domain. It ranges 1344 km in W-E direction and 928 km in S-N direction (169 x 117 = 19773 GP for a resolution of 8 km). VERA analysis ensembles are provided for the period 20-22 June 2007 on an hourly basis.

The VERA ensemble includes 50 VERA runs for the same date starting from slightly altered observations. **Note: The creation of the VERA ensemble is largely experimental. For detailed information on how the observations are disturbed the reader is referred to Gorgas and Dorninger (2012).**

File organisation

The filename would be unreadable long if all properties of the data should be reflected in the file name. It is therefore organized at different levels.

1. Level
   VERA_ensemble_YYYYMMDD.tar — contains all ensemble analyses including the reference analysis for the whole day (DD from 00 to 23 UTC) on an hourly basis
2. Level
   VERA_8km_YYYYMMDD_ref.tar.zip — ref-file contains the reference analysis for the whole day (DD from 00 to 23 UTC) in 8km resolution
   VERA_8km_YYYYMMDDHH_wav_equ_qc.tar.zip
   VERA_8km_YYYYMMDDHH_wav_std.tar.zip
   wav_equ_qc and wav_std contain 50 VERA analyses for given hour (HH) of given day (DD). wav_equ_qc and wav_std describe different ways of how the observations are disturbed (see Gorgas and Dorninger (2012) for more details). It is recommended to use wav_equ_qc-files for precipitation and wav_std-fiels for other parameters.
3. Level
   VERA_8km_YYYYMMDDHH_01_rf.dat — reference analysis (rf) valid for given hour (HH) and given day(DD), accumulation period of precipitation is 1 hour (01).
   VERA_8km_YYYYMMDDHH_01_NN.dat — NN analysis ensemble member for given hour (HH) and given day(DD), accumulation period of precipitation is 1 hour (01). **Note: all VERA ensemble analysis files are named in the same way independent on how the observation have been disturbed (wav_equ_qc or wav_std, avoid confusion if copied in the same folder)**

Header information

```
/home/srvx11/raid11/user/gorgas/VERITA_A
/home/srvx11/raid11/user/gorgas/VERITA_A
/home/srvx11/raid11/user/gorgas/VERITA_A
           1
   47.00000                                  latitude of origin
   10.00000                                  longitude of origin
  2007070305                                 date of analysis (YYYYMMDDHH)
           0
           1
           1
           0
           0
           3
 @
   1.000000
          50
          50
          50
           1
           9
           3                                 field resolution (2^x km, here: 2^3=8 km)
           3
         672                                 max. distance to origin in E-direction
         672                                 max. distance to origin in W-direction
         464                                 max. distance to origin in N-direction
         464                                 max. distance to origin in S-direction
         500
         200
          10
           5
           2
           0
 1 1 1 1 1 0 0 1 0 0 0 0 1 0 0
@
@
@
 veraxx3.0_alpha-fg
dyn.sn.FP_xy_W45.N17.0.0_6721.3601.1.1_1
dyn.wo.FP_xy_W45.N17.0.0_6721.3601.1.1_1
thermfp2k2mi.3000.2000.1.1.bin
@
@
@
@
@
01                                           precipitation accumulation period (x hours)
```

Field of analysis values:

19 columns:

```
-672.0000  -464.0000     0.0000     0.0000      -0.07      1.16      0.36     21.87     39.48
9999.00   9999.00   1016.19   9999.00   9999.00   9999.00   9999.00     -0.05   9999.00      7.08
```

1. x – coordinate (km, distance from origin)
2. y – coordinate (km, distance from origin)
3. z – coordinate (not used)
4. t – coordinate (not used)
5. precipitation (mm/ x hours, x hours are defined in the last line of the header and in the file name – some values may be below zero because of spline curvatures – ignore them)
6. 10m wind u - component (m/s)
7. 10m wind v - component (m/s)
8. 2m potential temperature (°C)
9. 2m equivalent potential temperature (°C)
10. not used
11. not used
12. msl – pressure (hPa)
13. not used
14. not used
15. not used
16. not used
17. precipitation (mm - analysis of uncorrected precipitation values, do not use this one, take value in column 5)
18. moisture flux divergence (kg/kg*s^-1*10^-4, post processing)
19. mixing ratio (kg/kg*10^-3, post processing)

Latitude and longitude values of Cartesian grid points are given in the file: VERA_ensemble_8km_ coordinates_lam_phi.txt. Values are organised in the same way as for the analysis data.

References:

Gorgas T, Dorninger M. 2012. Concepts for a pattern-oriented analysis ensemble based on observational uncertainties. *Q. J. R. Meteorol. Soc.* **138**: 769–784. DOI:10.1002/qj.949