How to read and plot SM-DAS-2 and SM-DAS-3

How to read and plot SM-DAS-2 and SM-DAS-3 Grib files

The SM-DAS-2 and SM-DAS-3 products are provided in GRIB-1 format, on a reduced Gaussian grid at the resolution T799 and T1279, corresponding to 25 km and 16 km respectively.

There are several tools available to read and plot grib files. Three applications and examples are provided to read and plot data from grib files:

1 Use GRIB API to extract time series over specific sites

We recommend to use the GRIB API software to read grib files. GRIB API can be downloaded from the ECMWF GRIB API web page. It needs to be used under Linux or UNIX systems.

For example if your SM-DAS-2 grib file is named SM-DAS-2_2009122700.grib, the command to extract data from the four nearest grid points from latitude YLAT and longitude XLON is:
grib_ls -p step,shortName -l XLAT,XLON SM-DAS-2_2009122700.grib

A more comprehensive script (and readme file) is given here with GRIB API to extract time series over four test sites. The example contains 3 directories:
- grib contains grib files of SM-DAS-2 31 for December 2009 (31 files).
- prog contains the script that needs to be used to extract SM-DAS-2 in acsii over 4 test sites.
- ascii_sites contains the times series extracted in ascii for the four test sites.
The readme file explains how to use and to modify the script. For any further questions concerning this example please contact Patricia.Rosnay@ecmwf.int.

2 Use Metview-python and other python libraries for reading and plotting

- Metview-python is recommended to extract and plot SM-DAS-2 and SM-DAS-3 grib data.This is essentially a python interface to the ECMWF Metview library.
- The software requirements, documentation and examples for metview-python can be found on the github page and ECMWF confluence page
- The examples below require this software, which is freely available on github: python 3.6, metview, pandas, pylab, matplotlib, numpy and cartopy and jupyter.
- If you need to install this software, the following scripts will install it in a local conda environment on linux or macOs:
  - conda_env_setup_linux.sh
  - conda_env_setup_macOS.sh
- Examples:
  - Plotting and saving a root-zone SWI time series of local data
  - Plot map of root-zone soil wetness index with metview-python
  - Conversion to regular grid and plot map with cartopy
  - jupyter-notebook examples

For any further information about using metview-python to read and plot SM-DAS-2/SM-DAS-3, please contact David.Fairbairn@ecmwf.int.

3. Using Matlab

Matlab is no longer supported at ECMWF. However, it is possible to read GRIB files using Matlab, which can be used on Unix, Linux and Windows systems. The library can be downloaded from read_grib_1.5.tar.gz .

Tools to read SM-DAS-2 from matlab are available at example_readgrib.rar.