Status of ERA5 Reanalysis Operational Production at ECMWF

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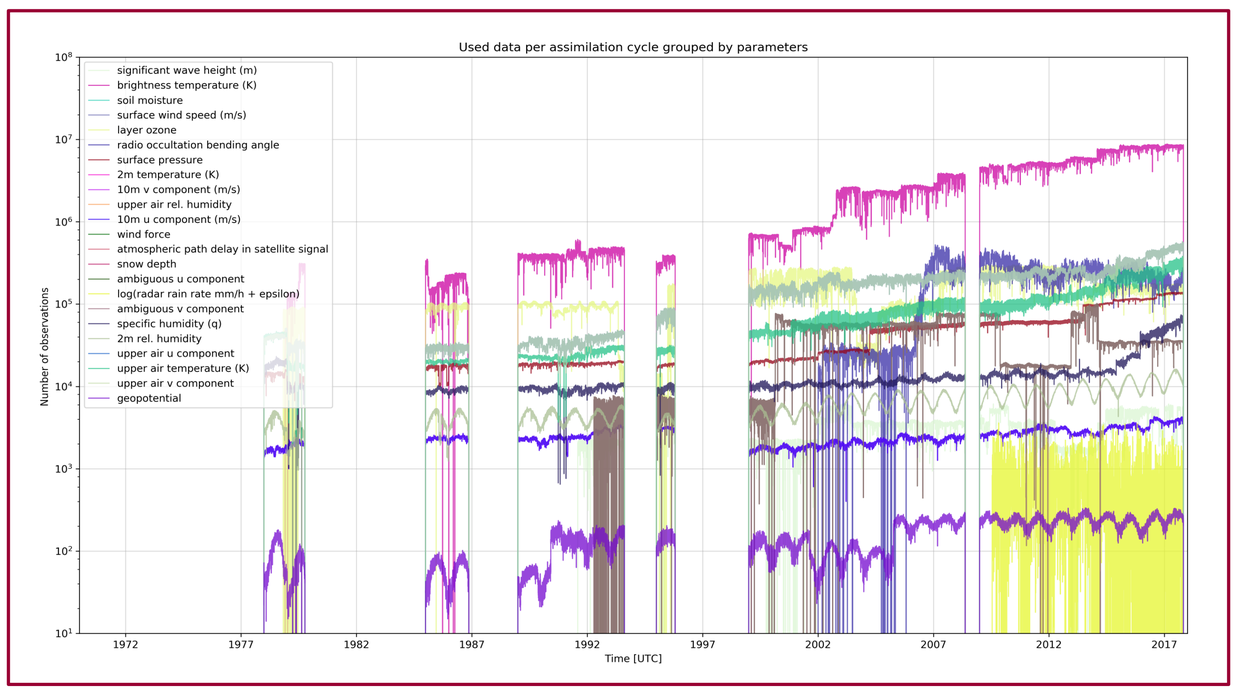
ERA5 is a state-of-the-art reanalysis covering the pre-satellite and satellite era (1950 - present). It is currently produced at ECMWF in the framework of the Copernicus Climate Change Service (C3S). ERA5, the successor to ERA-Interim, is the first reanalysis to be produced operationally as a service, rather than as a research project.

Improvements

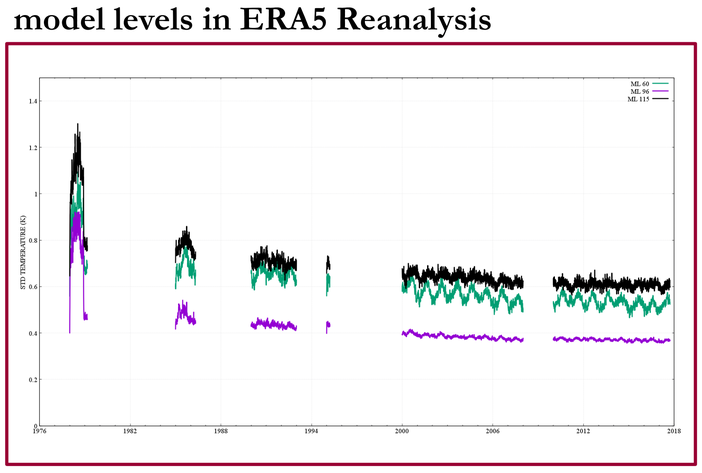
	ERA-Interim	ERA5
Period	1979 – present	1950 - present
Start of production	August 2006	2016 ; the production for 1950-1978 period will start later
Assimilation system	2006, 4D-Var	2016 ECMWF model cycle, 4D-Var
Model input (radiation and surface)	As in operations, *(inconsistent sea surface temperature)*	*Appropriate for climate*, *e.g.*, evolution greenhouse gases, volcanic eruptions, sea surface temperature and sea ice
Spatial resolution	79 km globally 60 levels to 10 Pa	*31 km globally (TL639)* 137 levels to 1 Pa
Uncertainty estimate		Based on a 10-member *4D-Var ensemble* at 62 km (TL319)
Land Component	79km	9km
Output frequency	6-hourly Analysis fields	*Hourly* (three-hourly for the ensemble), *Extended list of parameters ~ 9 Petabytes*
Extra Observations	Mostly ERA-40, GTS	Various *reprocessed CDRs*, *latest instruments*
Variational Bias correction	Satellite radiances	Also ozone, aircraft, surface pressure

Use of observations by parameter per assimilation cycle in ERA5

Reanalysis has to deal with very large number of observations whose amount varies over time.

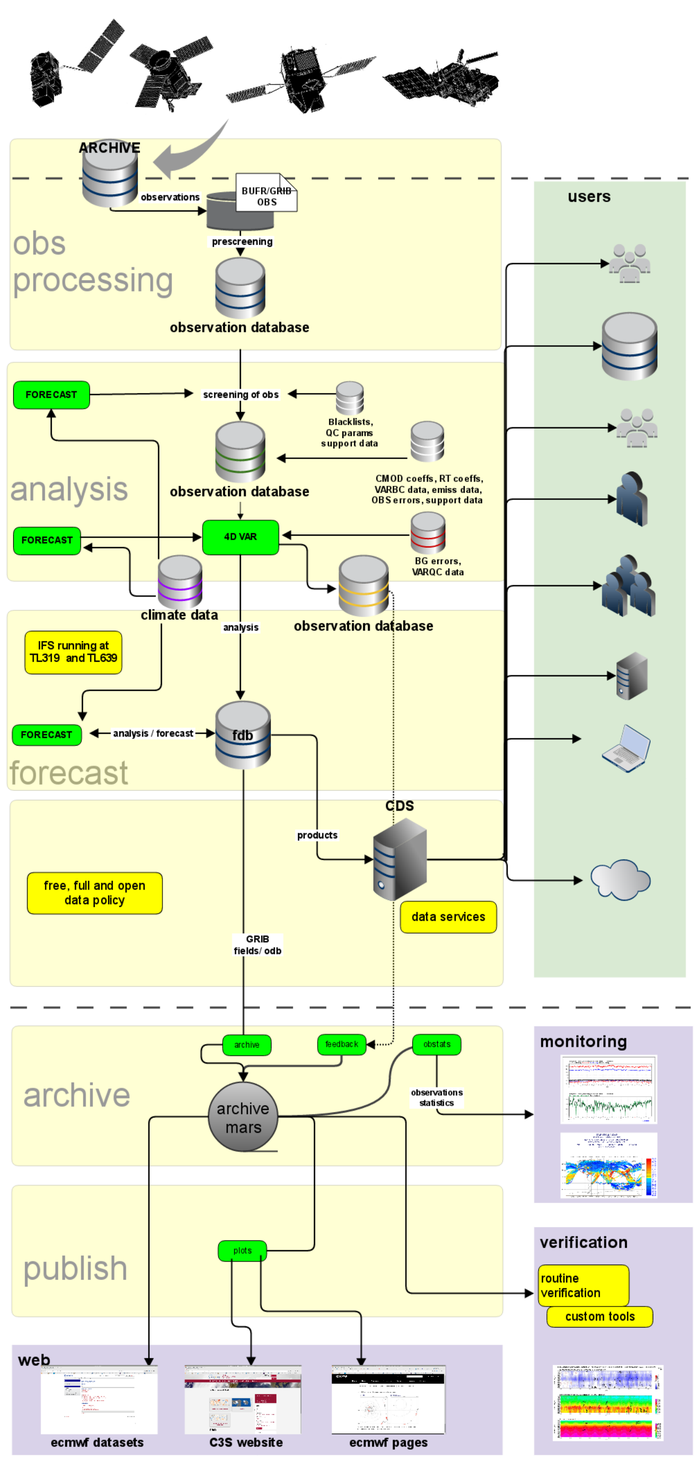


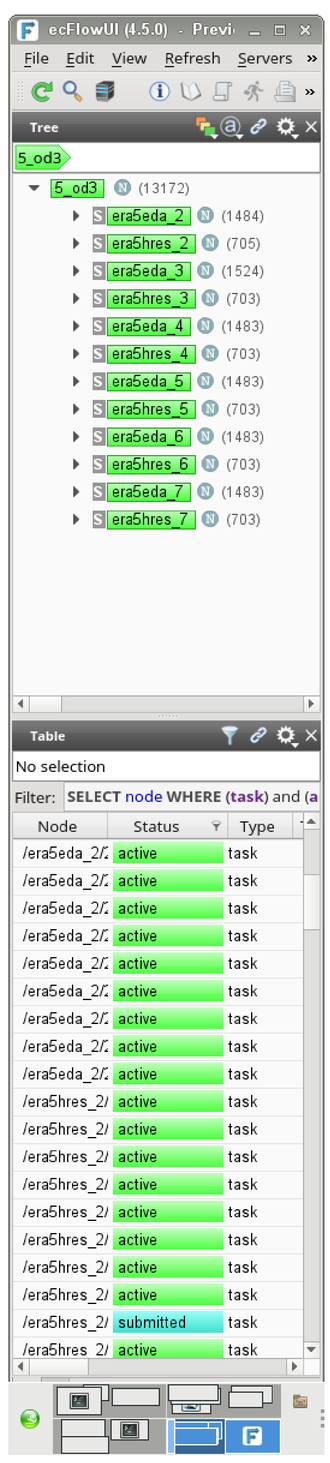
Estimates of Temperature Errors at different model levels in ERA5 Reanalysis



Each stream comprises a lower resolution TL319 10 member 4D-Var ensemble (EDA) providing flow-dependent background error information to the high resolution TL639 (HRES) deterministic assimilation cycle.

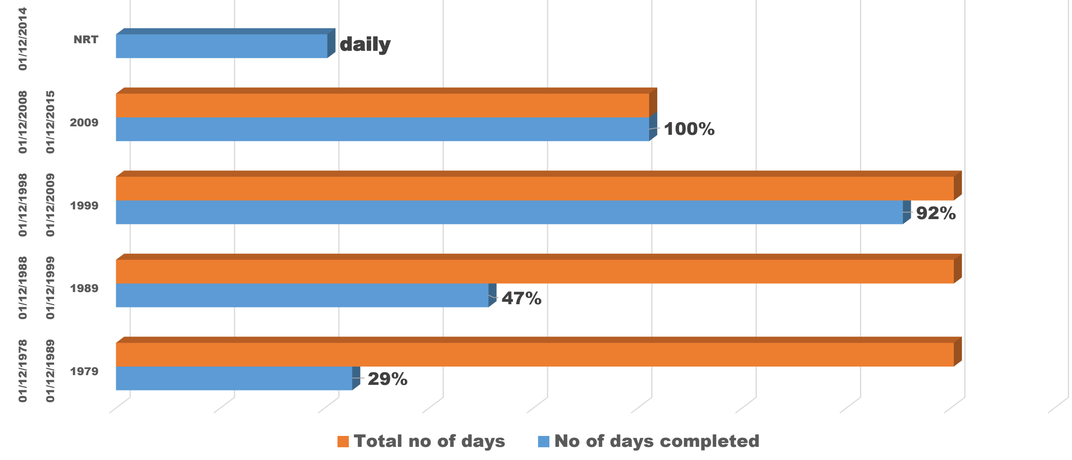
Production System Overview





Current Status of ERA5 Operational Production

The production covering the historical period is divided in 10 year parallel streams and a near to real-time ERA5 stream is produced daily.



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