ERA-Interim known issues

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ERA-Interim production stopped on 31st August 2019

For ERA-Interim (1st January 1979 to 31st August 2019) access through the ECMWF Web API **stopped on 01 June 2023**

Its successor ERA5 is available from the Climate Data Store (CDS) (What are the changes from ERA-Interim to ERA5?) and users are strongly advised to migrate to ERA5 (How to download ERA5).

For those users who still need access to ERA-Interim after 01 June 2023 (subject to further notice), they can do so via the Climate Data Store (CDS) API.

Please see the table below for guidance and workarounds of the ERA-Interim known issues

Known issues number	Issue type	Description	Cause	Workaround
KI1	Cloud fraction profile and the low, medium, high and total cloud fraction diagnostics	1. For ERA-Interim and other ECMWF products from IFS cycles before CY33R1, High/Medium /Low/Total Cloud Cover (HCC/MCC/LCC/TCC) diagnostics are calculated using the Geleyn and Hollingsworth (1979) computation method. This can produce slightly higher cloud cover than with strict maximum-random. 2. Inconsistencies between the prognostic cloud fraction profile and diagnostic HCC/MCC/LCC /TCC. 3. In IFS cycles before CY33R1, there is a bug which means the LCC is underestimated if there is cloud in the profile either side of the the MCC /LCC boundary and cloud fraction is less in the lower layer than in the higher layer. This also applies to MCC for the HCC/MCC interface.	1. The Geleyn and Hollingsworth (1979) computation method is a computationally efficient implementation and is reported as maximum-random, but it is not strictly maximum-random overlap as there is also some randomness if there is a minimum in the cloud fraction profile. 2. HCC/MCC/LCC/TCC are calculated from the start of timestep profile of cloud fraction, whereas the output profile of cloud fraction is from the end of timestep. 3. FS cycles before CY33R1 bug.	In order to have consistent data, it is suggested users calculate their own HCC/MCC/LCC/TCC from the cloud fraction profile.
KI2	Surface Photosynthetically active radiation (surface PAR) values are too low	In ERA-Interim there are two data fields for photosynthetically available radiation (PAR): • surface photosynthetically active radiation (par, code 58) • clear sky surface photosynthetically active radiation (parcs, code 20) Both are cumulative fields for the 12 hour periods 00:00 to 12:00 and 12:00 to 24:00, giving units of J m^{-2}. However, the surface PAR value (code 58) seems erroneously low. For example, in locations in the Celtic Sea, surface PAR is typically around 20% to 25% of the clear sky value (code 20), and about a third of in-situ measurement of surface PAR.	ERA-Interim is produced by the ECMWF Integrated Forecasting System (IFS), which we suspect has a bug in the calculation of surface PAR. It looks like IFS takes surface PAR from the wrong parts of the spectrum. There are shortwave bands that include 0.442-0.625 micron, 0.625-0.778 micron and 0.778-1.24 micron. PAR is coded as if it was intending to sum all of the radiation in the first of these and 0.42 of the second (to account for the fact that PAR is normally defined to stop at 0.7 microns). However, PAR is in fact calculated from the sum of the second band plus 0.42 of the third. The bug only affects surface PAR (code 58). Clear sky surface PAR (code 20) has a good fit with in-situ measurements and can be deemed trustworthy.	A rough estimate of PAR can be calculated from SSRD*AFACT where SSRD is the "Surface solar radiation downwards" and AFACT is a multiplier that depends on location, season, atmospheric conditions etc. There is no single best method to estimate AFACT, but for guidance see for example Jacovides et al. (2003) and Yu et al. (2015)
KI3	Convective Available Potential Energy (CAPE) values are zero	In ERA-Interim the Convective Available Potential Energy (CAPE) values are all zero for 03:00 and 15:00.	This is a data error, caused by an error in how ERA-Interim calculated CAPE at step 3 (+03 hours forecast). The error does not affect other steps. 03:00 (00:00 + 03h) - erroneous values! 06:00 (00:00 + 06h) 09:00 (00:00 + 09h) 12:00 (00:00 + 12h) 15:00 (12:00 + 03h) - erroneous values! 18:00 (12:00 + 06h) 21:00 (12:00 + 09h) 24:00 (12:00 + 12h)	There is no workaround for this issue. ECMWF do not have alternative CAPE data for +03 hours.
KI4	Sea Surface Temperature (SST) has values over land	In ERA-Interim the Sea Surface Temperature (SST) over land should be Null or 'missing_value' -32767. However, this is only the case at time 00/12, step 0. At steps 3/6/9/15/18/21 the SST values over land are zero deg C.	The 00/12 values are analysis values which we get from different sources (NCEP, NOAA, and since 2009 from UK Met Office OSTIA) and re-grid. See Dee et al. (2011) specifically sections 2.2 and 3.4. The 03/06/09/15/18/21 values are forecast values calculated by our forecasting system IFS. There is a glitch in the application of the land-sea mask in the forecast, with two effects: 1. The SST is set to 0 degrees C over land 2. Along the coastline and inland water bodies points are interpolated horizontally between over-land points (0 degrees) and over-water points (valid SST), the resulting SST is too low.	Option 1: If you only need the analysis, not the forecast, use OSTIA itself, which has a much higher spatial resolution and is available for free from the Copernicus Marine Services, details here. Option 2: Use the land sea mask to mask out land points. Beware however, the results of this can be difficult to interpret if the values have been interpolated from the native grid.
KI5	Not full (archived) resolution ERA-Interim data from the point and click web interface	It is not possible to obtain full (archived) resolution ERA-Interim data from the point and click web interface. Instead you get: 1. For spectral data, when grid=128 is selected, automatic truncation to T213 occurs. 2. The option "Grid default (as archived)" gives a 0.75x0.75 lat/long grid for both spectral and grid point data, again with automatic truncation to T213 for spectral fields. 3. The Gaussian grids all appear to be full grids, not reduced, with no means of requesting the latter. 4. There is no T255 option	ND	ND

KI6	Spurious extreme values in some atmospheric fields, and ripple effects in related fields,	From time to time, ERA-Interim exhibits spurious extreme values in some atmospheric fields, and ripple effects in related fields, as in the example below. The spurious values can have large magnitudes. See two examples in the images: ERA-Interim-ripples.png SST-201406280600.png The documented cases so far are: • 27 Sept 1980 at 00 UTC (1980-09-26 12:00 + Step12) in parameter mx2t (Maximum temperature at 2 metres since previous post-processing) at latitude -12.75, longitude 213.75, with mx2t = 343.1K • 28 June 2014 at 06 UTC for SST analysis at surface level • 30 May 2016 at 12 UTC at the 1000 hPa level, and at 10m wind, at about 30N 148E in the Pacific east of Japan • 13 July 2016 at 00 UTC at the 700 hPa level, at about 20S 135E in central Australia • 16 December 2016 at 00 UTC: 10 metre U wind component has a value of 117m/s at about 35.44 N,159.20E (east of Japan).	This issue could be caused by an error in the model or in the data assimilation.	Unfortunately ECMWF do not have the resources to correct the problem and recreate the ERA-Interim data for the affected dates, so we can not offer a solution or workaround.

References

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Jacovides, C., F. Tymvios, D. Asimakopoulos, K. M. Theofilou, and S. Pashiardes, 2003: Global photosynthetically active radiation and its relationship with global solar radiation in the Eastern Mediterranean basin. *Theor. Appl. Climatol.*, **74**, 227-233, http://doi.org/10.1007/s00704-002-0685-5

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