

ECMWF test data generation for IRS

Presentation Date, Subtitle and/or presenter
information



Test data generation: status in November 2018

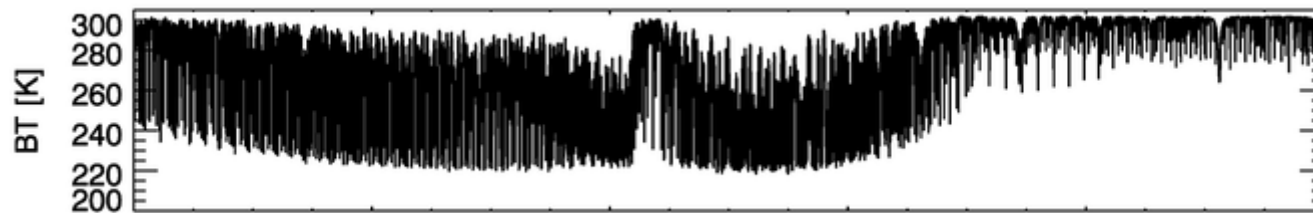
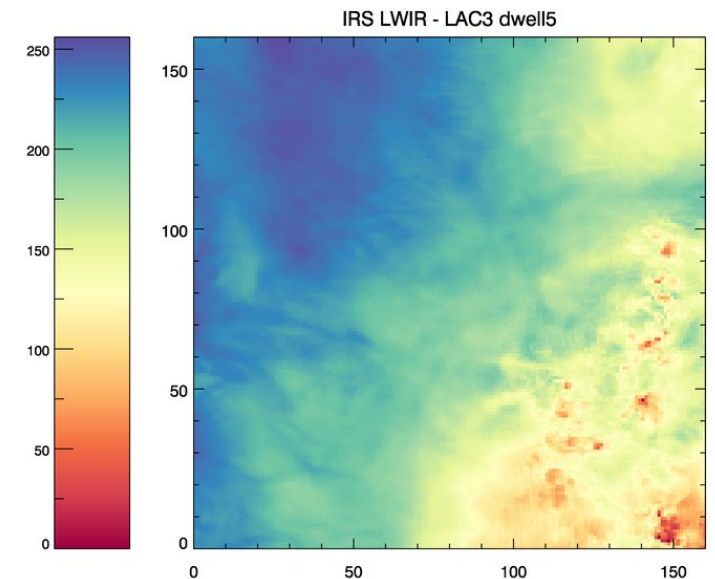
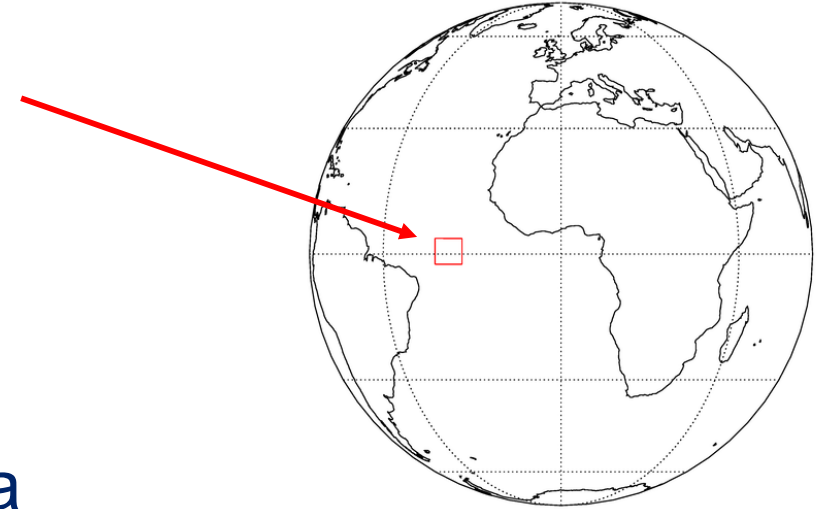
Constraints on IRS test data generation

- In the IDPF-S the minimal chunk of data is a **dwell in L0 format**, there is probably no possibility to ingest a single spectrum
- In order to generate a geophysically realistic dwell, at least **1 vertical profile per pixel** (i.e. every 4-6 km) is theoretically required. High-resolution NWP fields are available over Europe but not over the whole area covered by LAC4 (not to mention the other LACs)
- Furthermore, for each pixel a high-spectral-resolution spectrum is to be simulated i.e. **25600 RTM runs** for a single dwell: that will be computationally expensive (especially if clouds are included)
- Testing the spectral calibration will require to simulate **several dwells in the SCZ**
- **Auxiliary data** will be needed, e.g. position of the sun but also the output of the periodic characterizations of the FIM, front section etc...
- **Imager mode** should be tested as well which put even more constraints on the scene generation

ECMWF has then proposed to generate data from their experimental high spatial resolution model

Experiment setup

- Full dwell (dwell 5, LAC 3) of very high spectral resolution spectra ($10\text{-}3\text{ cm}^{-1}$) at the IRS resolution
- Spectra generated using LBLRTM
- T , q are dynamically modelled. Traces gases (22 of them) distribution is realistic but is not a dynamic variable (including O_3).
- Effect of slanted views not taken into account (not important anyway for a dwell in the vicinity of the sub-satellite point)

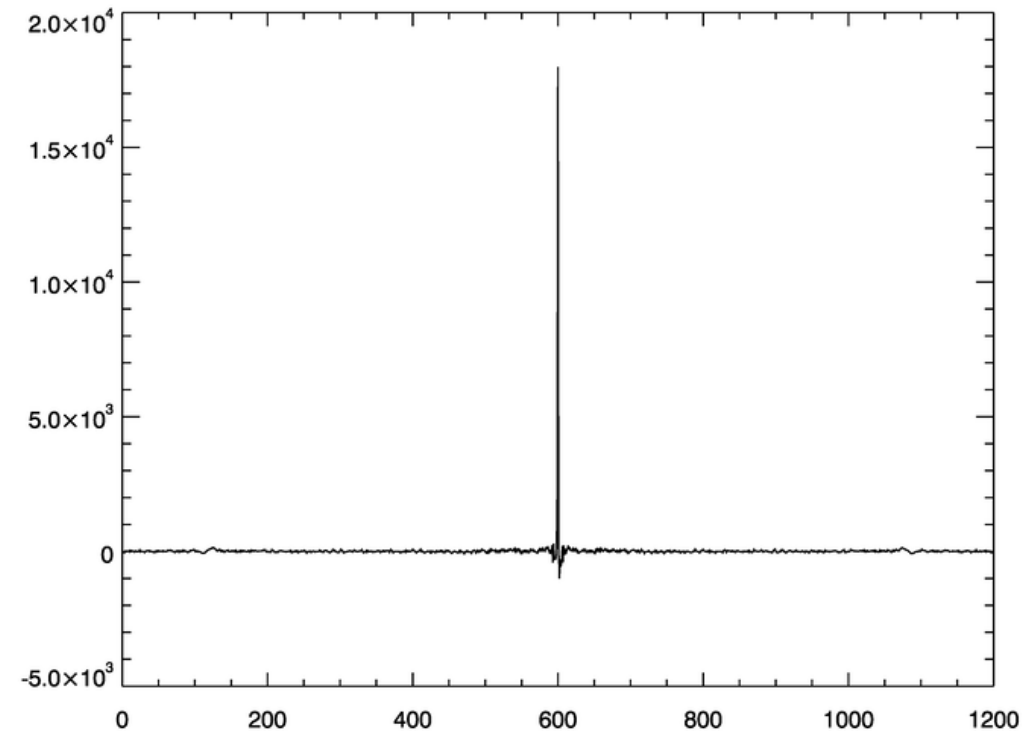


Generated dataset

- 8 days of LBL computation for 1 dwell
- 25600 files, each of them containing a spectrum covering 500 to 3000 cm^{-1} generated
- 1 file is 126.4 Mb \rightarrow 1 dwell is 8.6 Tb

Dataset usage

- The spectral characteristics of this dataset permits its use as input of the “scene generator” of IRASS → generation of a pseudo-L0 IRS product (and subsequent L1)
- Significant computational cost (comparable to the LBL computation)



Way forward

- **Computation of a full disk or even a full LAC clearly not possible** (computation time of the order of years, hundreds of Tb)
- IRASS requires HR spectra for performances assessment. Mass production using a fixed instrument without computation of the SRF (→Product Data Generator) would relax this requirement
- The delivery of version 1 (i.e. uncomplete) of the PDG has however been delayed to January 2020
- The definition of the tests to be performed must guide the scope of the data to be generated:
 - Sea/land/mixed ?
 - Clear/overcast/scattered ?
 - Nadir/slanted views ? Spectral calibration zone ?
 - What is to be tested ?
 - Assessing the spectral/radiometric performances does not necessarily require a full dwell
 - Assessing the data flow/timeliness does not require accurate geophysical simulation

