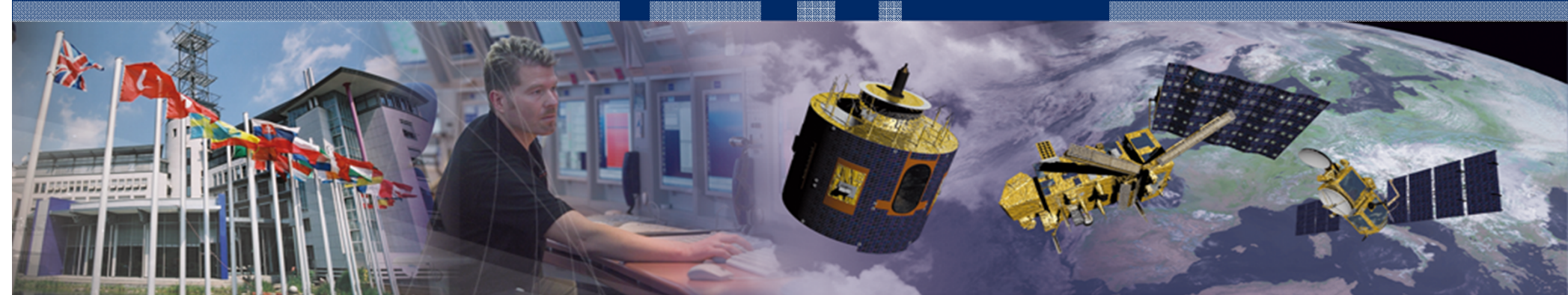




Towards a consolidated MTG-IRS L2 processor

Stephen Tjemkes, Xavier Calbet, Alessio Lattanzio,
Rolf Stuhlmann





Meteosat Third Generation Infrared Sounder (MTG-IRS)

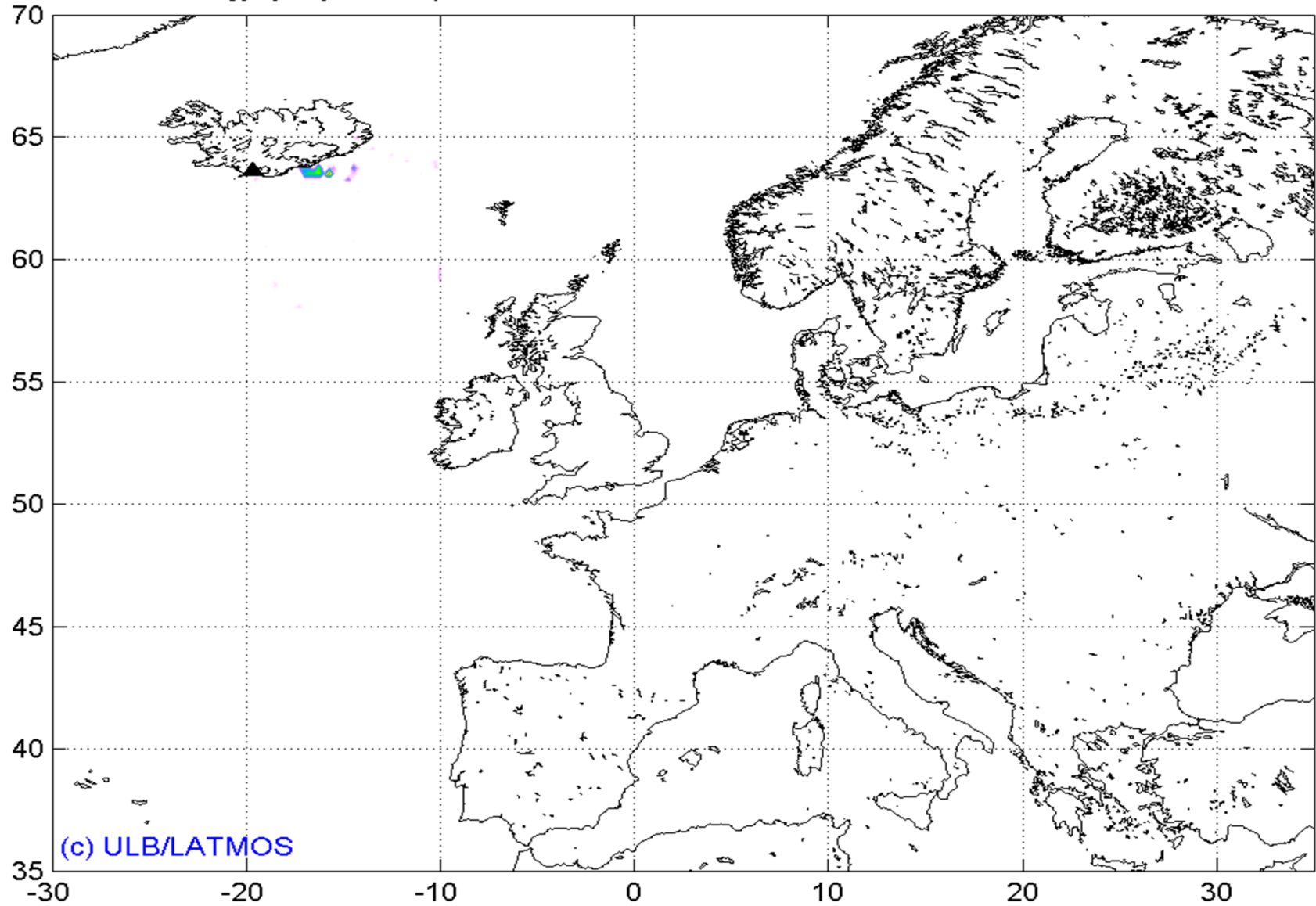
Primary Mission Objective:

To provide high spatial and temporal resolution observations of atmospheric state, in particular moisture .

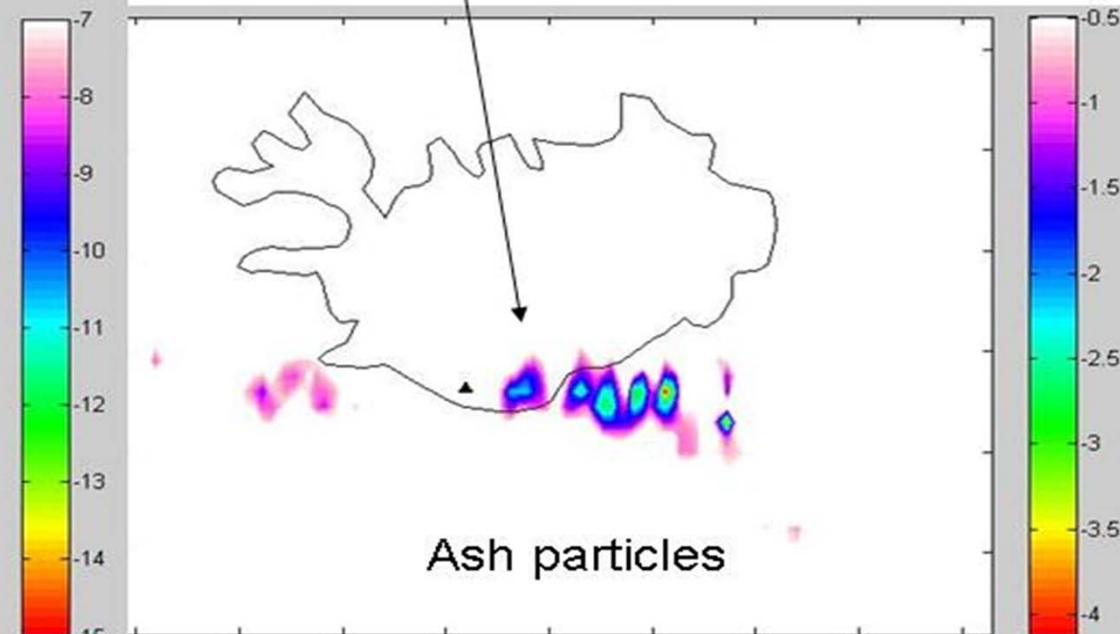
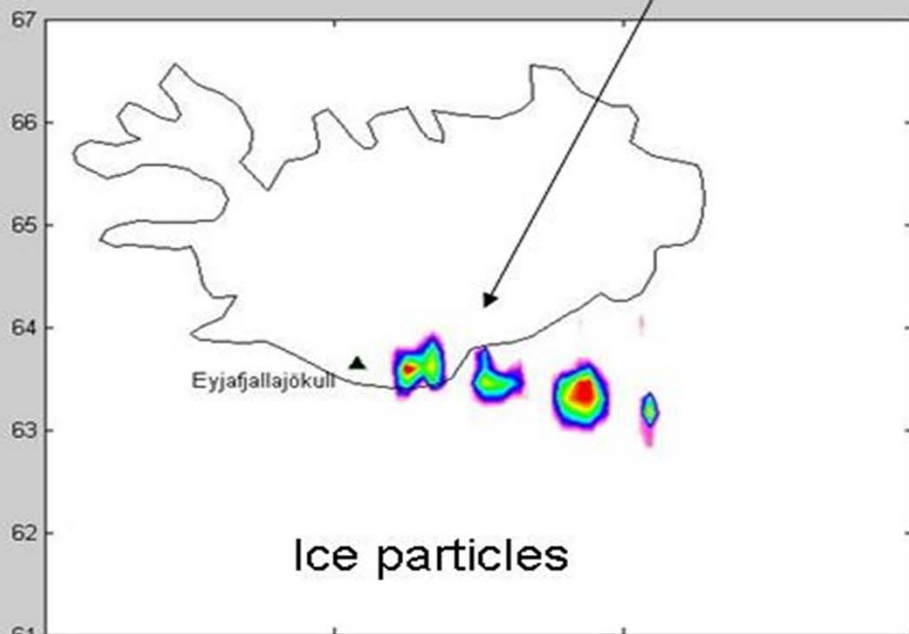
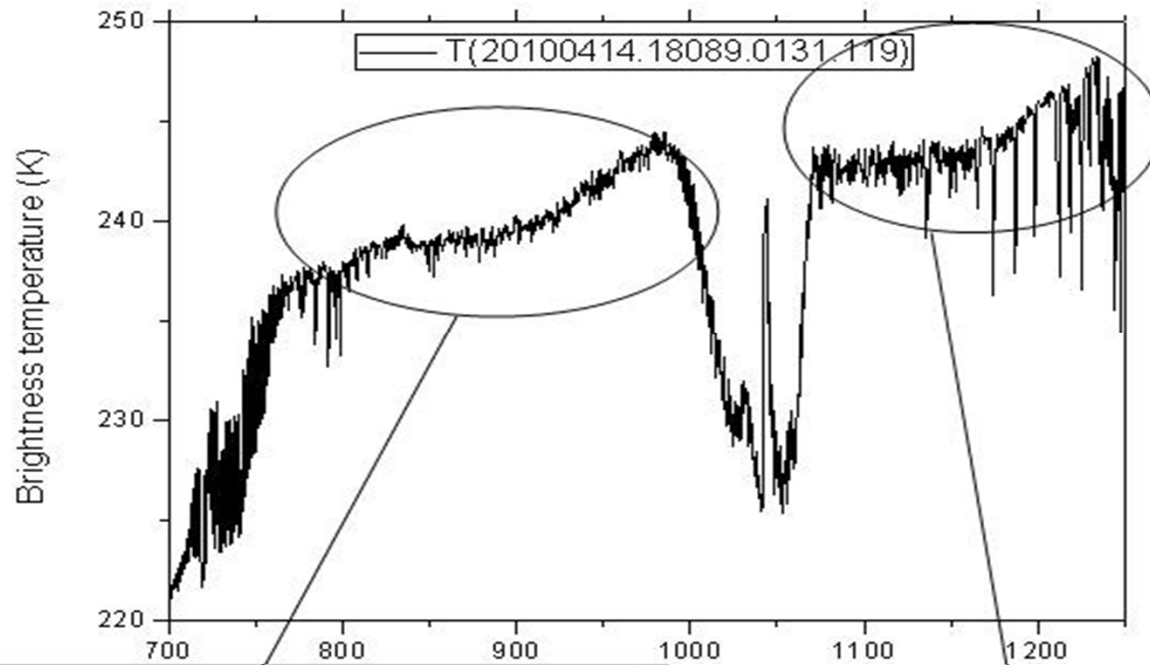
Further Mission Objective:

Eyjafjallajökull lässt grüssen

Eyjafjallajökull eruption - IASI Ash radiance index - 14.04.2010 ~22h UTC



Cathy Clerbaux, Lieven Clarisse, P. Coheur, D. Hurtmans



Cathy Clerbaux, Lieven Clarisse, P. Coheur, D. Hurtmans 



Meteosat Third Generation Infrared Sounder (MTG-IRS)

Instrument Characteristics:

FTS, large detector array, integration time of 10 sec.

Large data volume: approx. 2500 spectra / sec.

(cf. IASI: 15 spectra / sec)

Development of L2 Concept

Why ?



Issues being considered

General Processing Issues:

- Use of compact representation of radiances (PCA)

- Apodisation

- Channel Selection

Data Acceptance

Specific Scene Analysis

Pre-Processing

- Surface Properties retrieval

- Specific Statistical retrieval method to generate First Guess

Iterative Retrieval

- Background state and covariance for iterative retrieval

- Forward model errors

- How to handle CO and O3

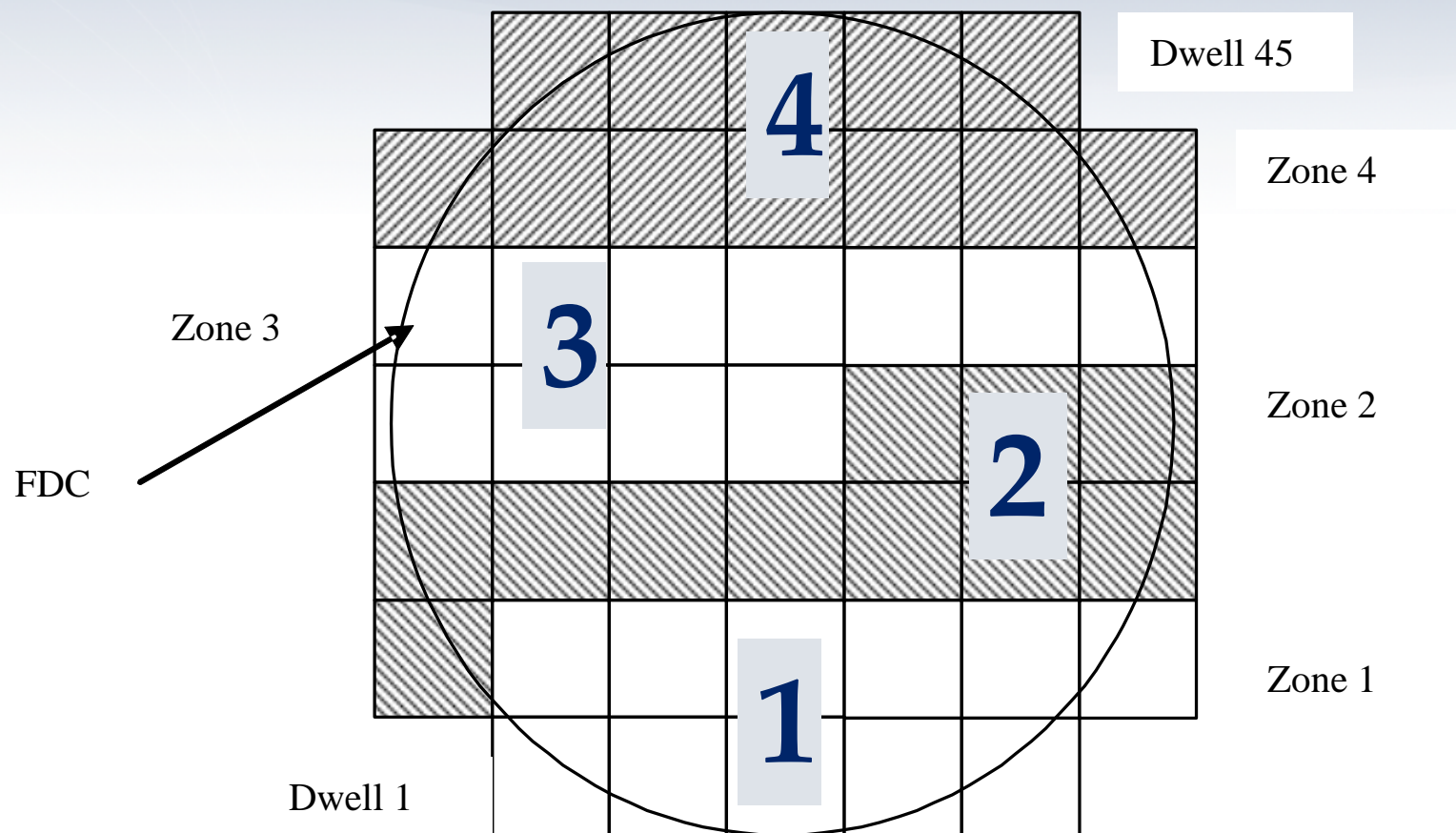
Specific Quality Indicators

Examples

Data Acceptance



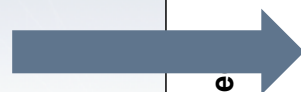
Four 15 min scan zones.



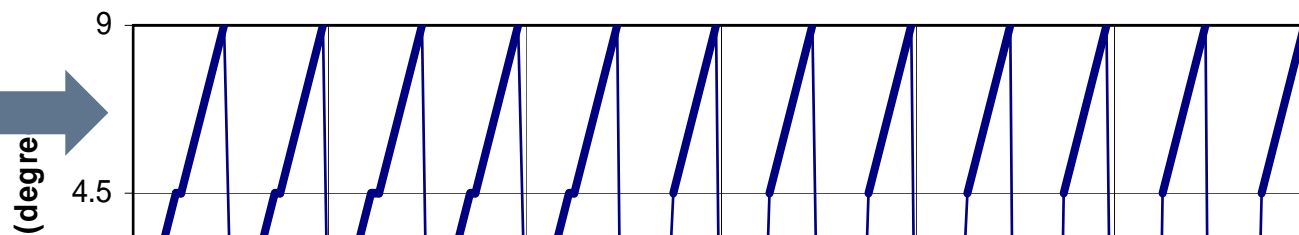


Zone 4 observed in 15 min every other 15 min

Zone 4

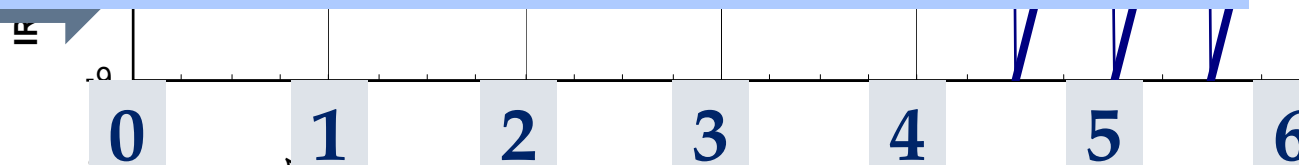


Operational practice for IRS scanning pattern



At Day-1: L2 Processor will only consider Zone 4 data.

Zone 1



Elapse Time (hours)

Development of L2 Concept

How ?



How (1): MTG-IRS Science Team (MIST)

P. Antonelli (SSEC)

N. Bormann (ECMWF)

G. Camps-Valls (Univ. Valencia)

S. English (Met Office)

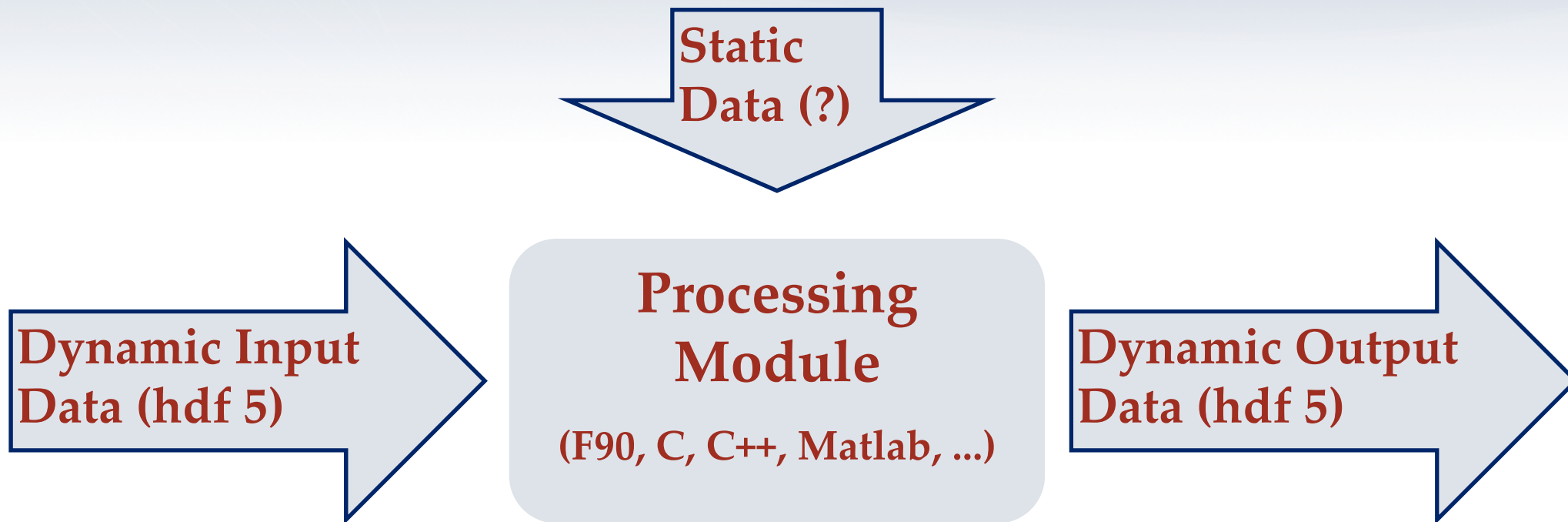
F. Friedl-Vallon (KIT)

L. De Leonibus (CNMCA)

S. Klonecki – P. Prunet (Noveltis)

C. Serio (DIFA)

How(2): Processing Framework



Illustration

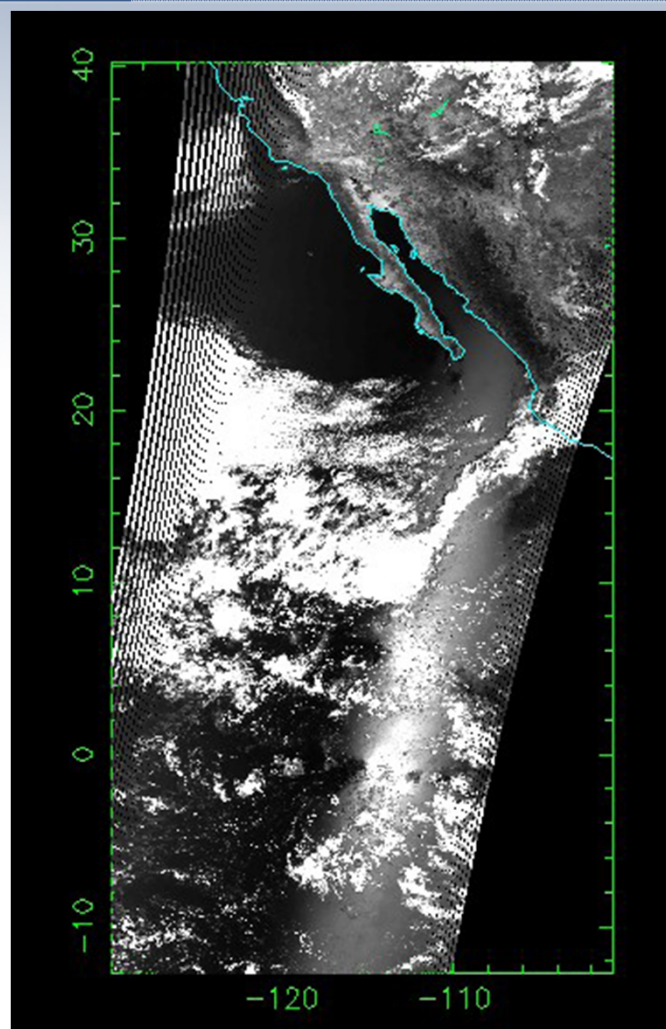
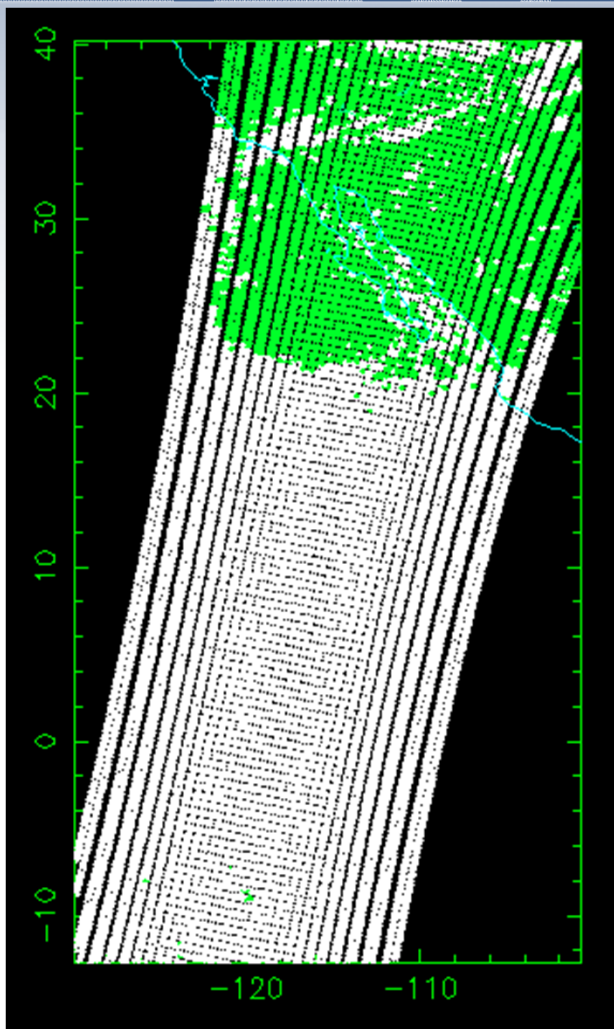
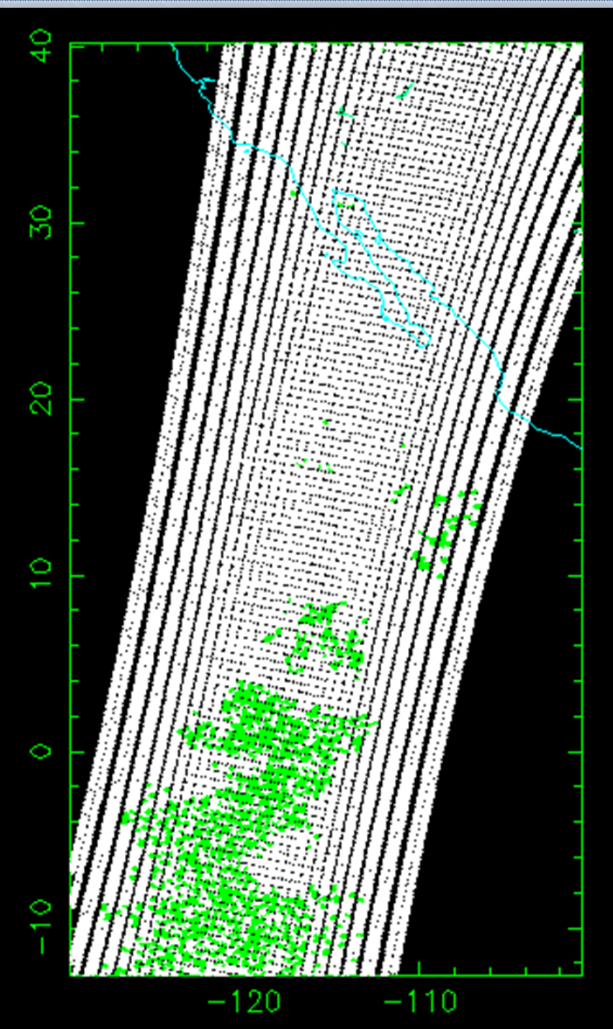
Two different Scene analysis modules applied to
same IASI data



DIFA

EUMETSAT

AVHRR



Green: cloud free, white: cloudy



Illustrates the need for a reference dataset.



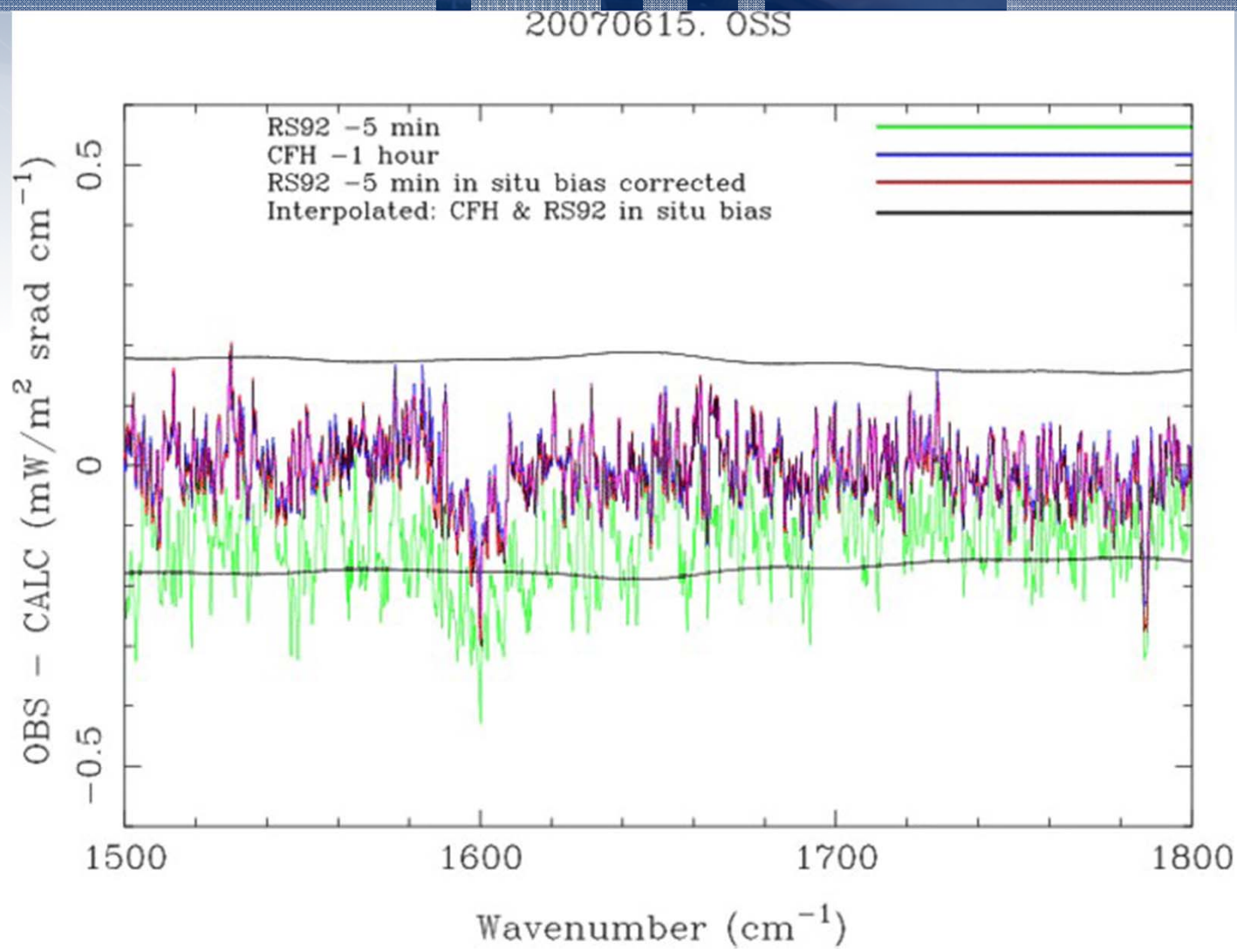
Further issues: Covariance Matrices

Maximum likelihood method requires specification of

- background state and covariance matrix
- forward model error covariance matrix.

How to establish forward model error covariance matrix?

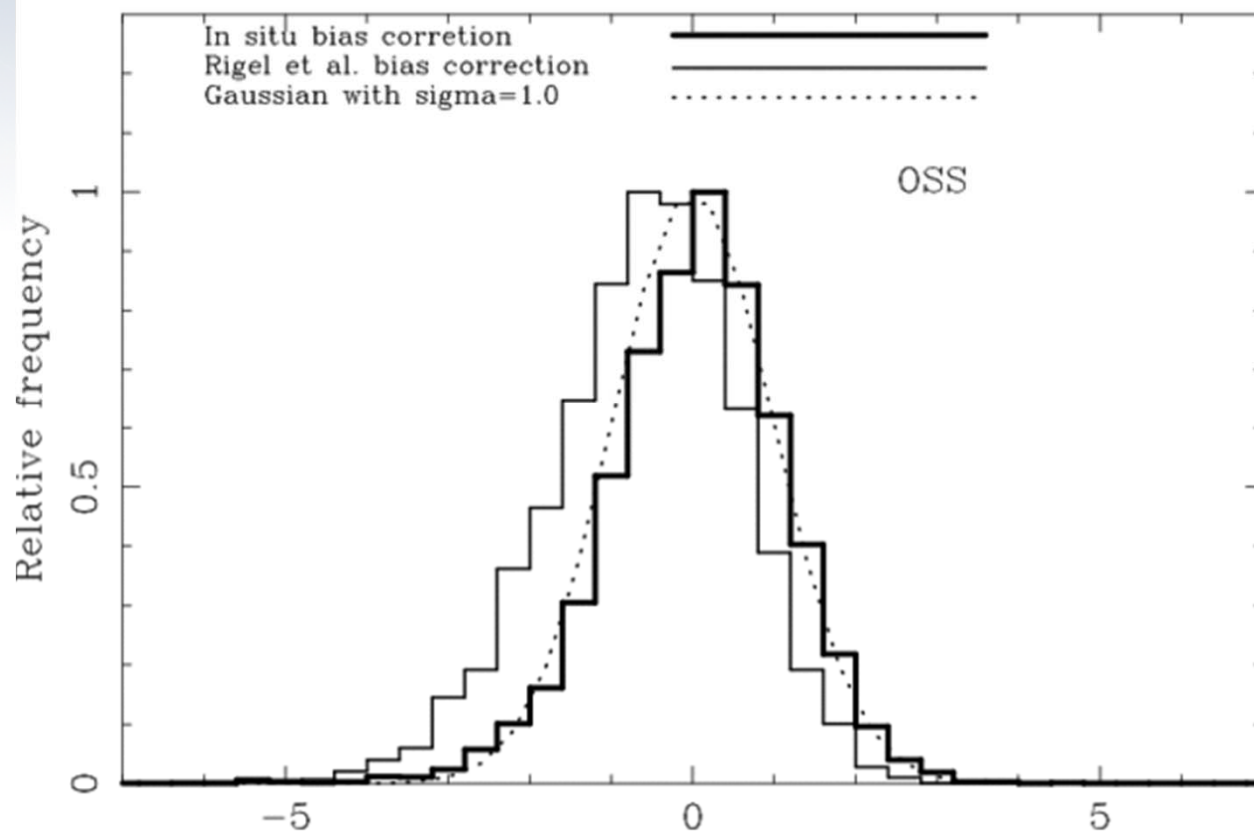
Radiance difference IASI - Calculations





Histogram Noise Normalised Differences

Chans. $w_n > 1500$ & < 1570 or $w_n > 1615$ & < 1800 cm^{-1} . All days



IASI instrument noise normalized radiance residuals

Summary



Through the concerted effort by MTG-IRS Science Team, we hope to converge towards a consolidated MTG-IRS L2 processor capable of generating products which satisfies the needs of the user community.