THE MTG-IRS LEVEL 2 PROCESSOR: NWC APPLICATIONS

Stephen Tjemkes and Rolf Stuhlmann
EUMETSAT
Co-Author list

Development: P. Antonelli, C. Serio, G. Masiello, E. Holm, L. Lavanant

Data Assimilation Applications: S. De Haan, P. De Valk, G.-J. Marseille, T. Cherubini

Now Casting Applications: C. Herold, J. Asmus, K. Hungershöfer, M. Koutek

GEO Programme Scientist: R. Stuhlmann
Meteosat Third Generation InfraRed Sounder (MTG-IRS)

- Part of EUMETSAT geostationary satellite programme.
  - Mounted on MTG-S platform
  - Planned launch 2021
- Mission objective:
  - High spatial and temporal resolution observations of $q(p)$ and $T(p)$
MTG-IRS Instrument

• Imaging FTS:
  • moderate spectral resolution (0.625 cm\(^{-1}\)) in two bands (700-1210 cm\(^{-1}\) and 1600-2175 cm\(^{-1}\))
• Spatial sampling 4 km at SSP
• Temporal sampling: 10 sec
• 2 detector arrays: 160 x 160 detectors
Recall Spatial Coverage

- The Earth disc is split in 4 Local Area Coverage (LAC) Zones
- Numbered from South to North
- Hence LAC1 is South Africa and LAC4 is Europe (strange shape needed to cover Canary Islands)
- 1 LAC covered in 15min (so the entire Earth can be theoretically covered every hour)
- But LAC4 is revisited every 30min
MTG-IRS Level 2 Demonstration and Validation Processor

• Supports the detailed definition of the operational processor,
• End-to-end Processor
  • Pre Processing: Scene classification
  • Product generation: 1DVAR
    • Based on UWPHYSRET/Mirto used for CrIS/IASI at Univ. of Hawaii with direct readout
  • Post Processing: Scaled Projected State
• Selected results from application to IASI data.
Demonstrations for NWC applications

• Analysis:
  • LAPS
  • W3Dx
• Assimilation in regional scale NWP
Analysis of TT index with and without L2 products by LAPS

- Results 29 July 2012, 18UTC

**TT-index values:**
- > 50 moderate-severe thunderstorms
- > 60 severe thunderstorms
Weather 3D Explorer application [KNMI]

• Work by M. Kouteck (KNMI) to integrate level 2 products into a 3D visualisation tool
• Poorly represented here as static 2d images.
Theta W from retrievals in W3Dx
Theta W from retrievals and HARMONIE in W3Dx
Direct assimilation of L2 products

• Currently investigation of relative merits of level 2 assimilation after transformation of level 2 to mitigate background information (Following Migliorini, 2012)
• Currently focus on single profile to test the technical infra-structure, next will be assimilation of all IASI products for 3 week period
Location of the single level 2 profile: Altenstadt, Germany
Comparison to collocated RS of Altenstadt Germany

![Graph 1: Temperature vs. Altitude](image1)

![Graph 2: Specific Humidity vs. Altitude](image2)
Increment of T/q assimilation

Temperature increment

Specific humidity increment
Initial results projected state assimilation

Temperature increment

Specific humidity increment
Summary

• Introduced some results of to prepare the NWC community of the upcoming MTG-IRS era.
• Further details in posters:
  • The MTG-IRS Level 2 Processor: Background
  • The MTG-IRS Level 2 Processor: Data Assimilation