Météo-France progress and plans

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Joint ALADIN GA / HIRLAM Council

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Outline

- Operational changes and e-suites in ARPEGE and AROME
- New applications based on AROME
- Outlook on plans for the NWP systems at MF
- Highlight on AROME R&D : added value of the AROME-EPS, refer to Tour d'ALADIN slide (by Piet)

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ARPEGE recent changes and e-suite

- CY41T1_op1 : switch to Operations on 8 December 2015
- CY42_op2 : porting to Operations is ongoing, switch planned for March-April 2017
  - ARPEGE physics:
    - new prognostic convection scheme, dramatically improving the representation of the life cycle of deep convection
    - Implementation of the SURFEX tiled surface scheme
  - Improvements in the assimilation of satellite radiances:
    - New : GPM/GMI (US), FY3-C/MWHS2 (China),
    - Denser : geostationary radiances, IASI (Infrared)
    - More channels : SEVIRI, IASI
    - On the whole, the increase of the volume of observational data assimilated in the e-suite is about + 50 % for IASI data and + 30 % in total (of observations assimilated)
  - Etc.

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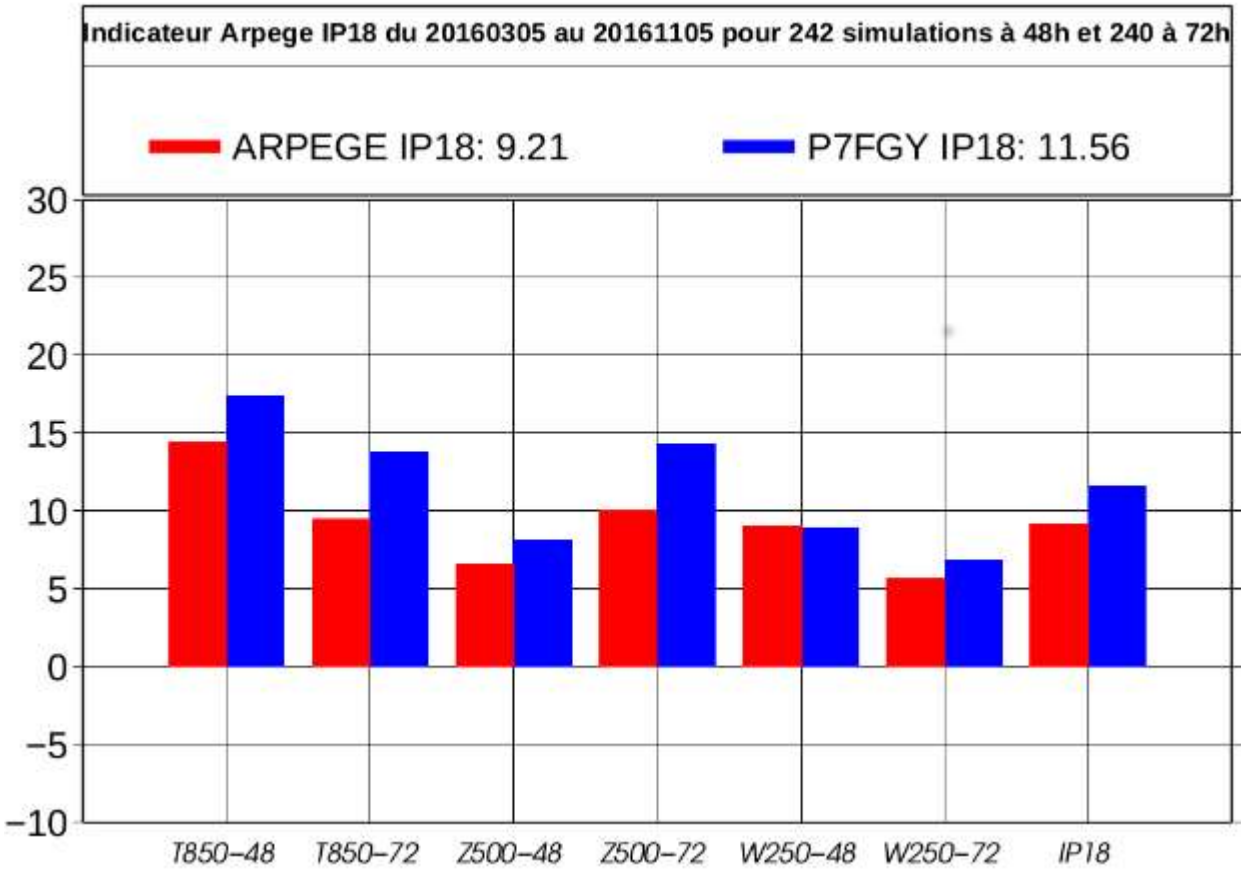
ARPEGE e-suite evaluation in progress; ARPEGE indicator (« IP18 »)

- Globally positive scores w/r to RS and ECMWF analysis
- Improved representation of precipitation (extension, daily cycle)
- Improved diagnostics of wind gusts
- Changes in forecast behaviour of T2m, RH2m and V10m
- Both objective and subjective evaluation is ongoing



AROME recent changes and e-suite

- CY41T1_op1 : switch to Operations on 8 December 2015
- CY42_op2 : porting to Operations is ongoing, switch planned for March-April 2017
  - Same modifications as in ARPEGE for observations
  - New cloud optical properties (collaboration with HIRLAM/DMI)
  - Ocean 1D mixing layer scheme in AROME-OM (Overseas versions of AROME)
  - Evaluate a method in order to reduce the « spin-up » time of AROME in the first forecast hours
  - Code and system optimizations
  - Etc.

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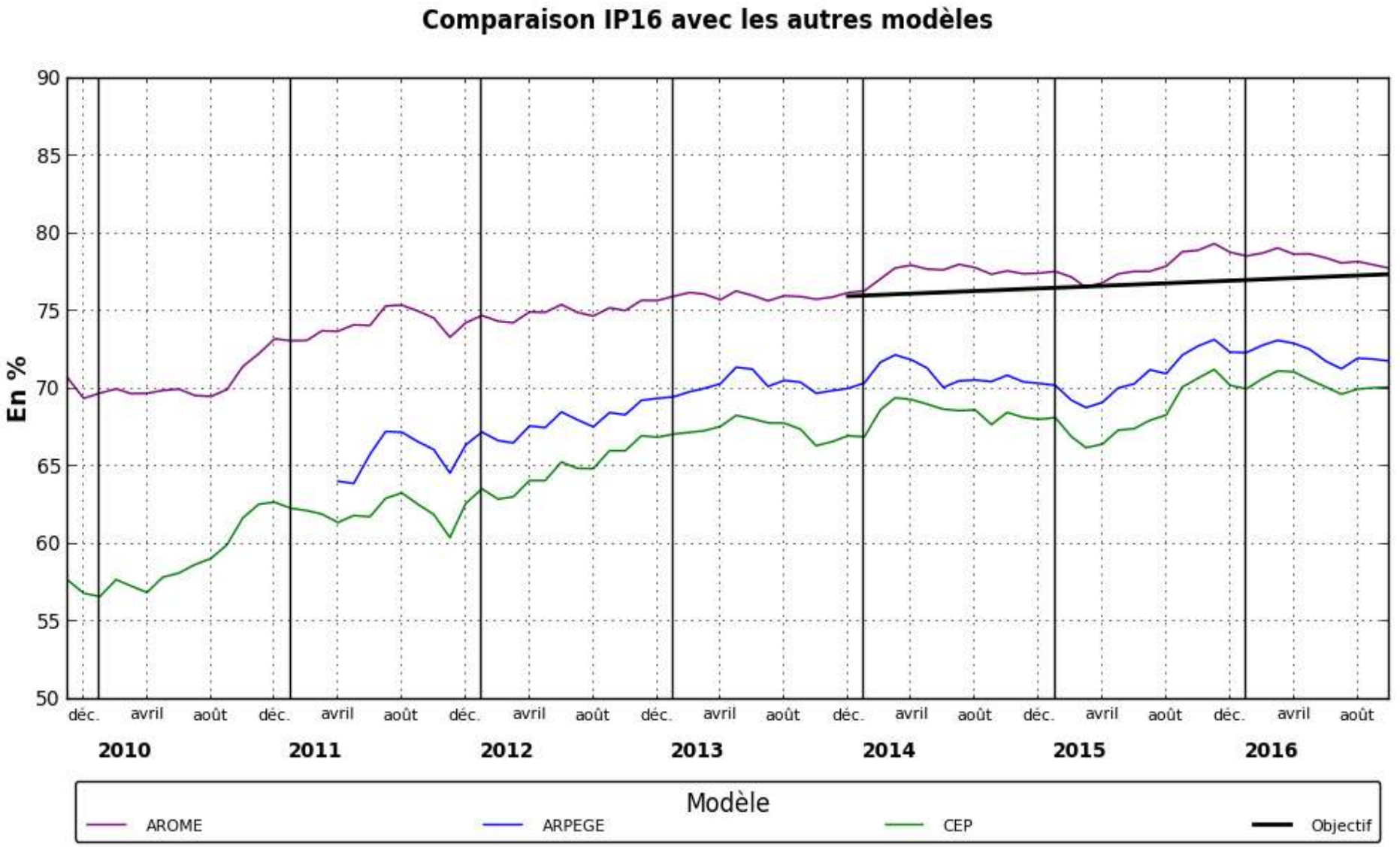
AROME composite score and added value w/r to global models

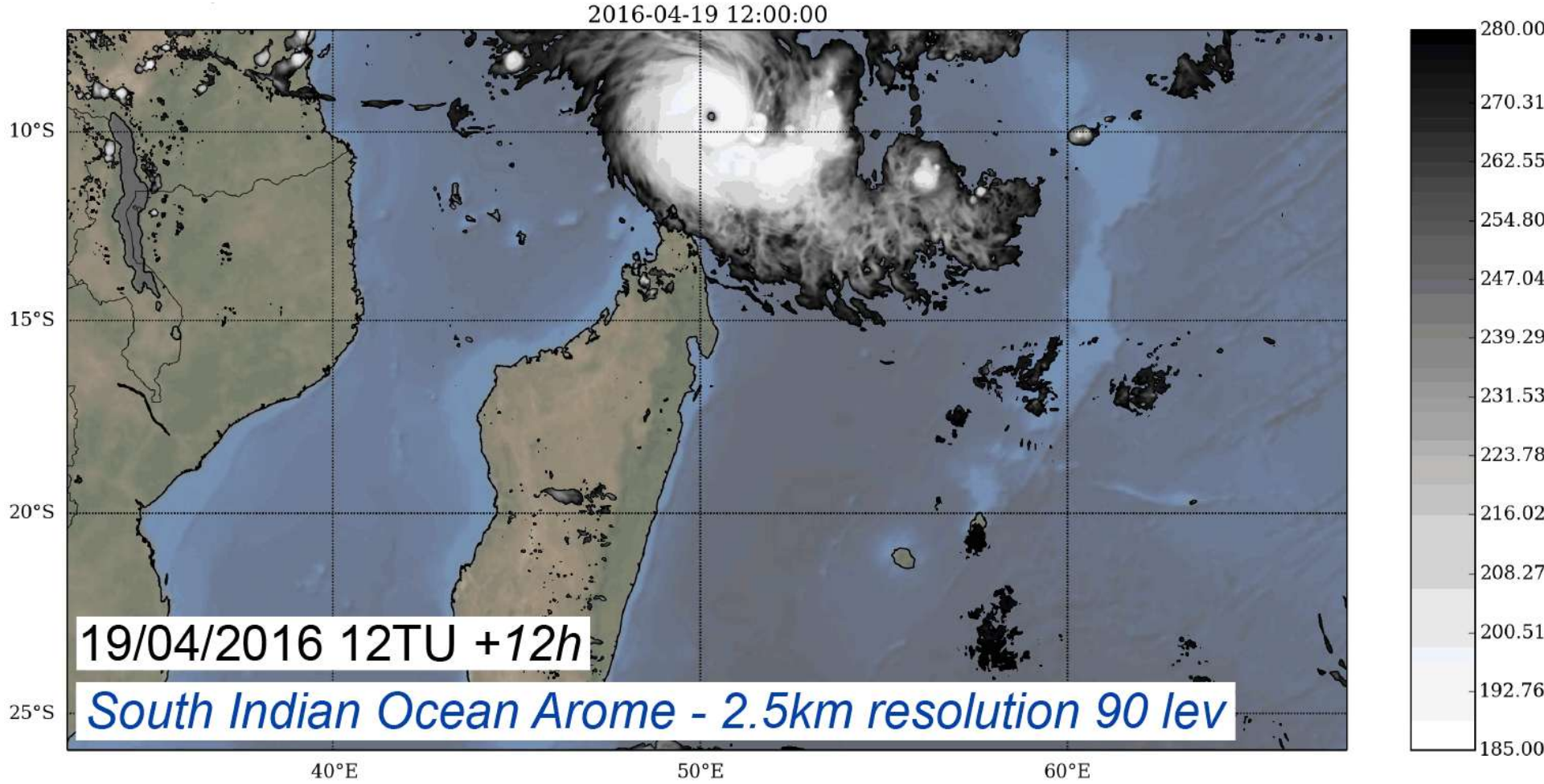


AROME systems implemented

- **AROME Overseas:** five domains in dynamical adaptation from the IFS. In operations since 11 February 2016.
- **AROME-Nowcasting ("AROME-PI")**: operational since 21 March 2016;
- **AROME EPS ("PEARO")**: currently in pre-operational phase;

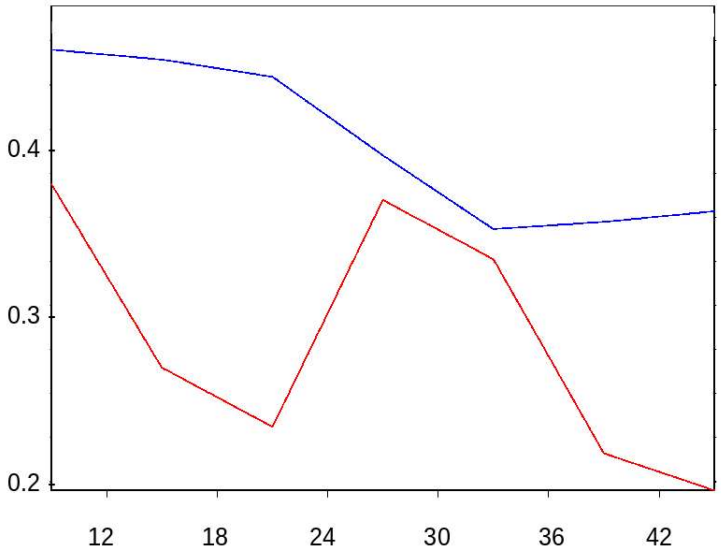
AROME-Océan Indien

- Simulated MeteoSat-7 IR brightness temperature ; TC « Fantala »



Convection-permitting EPS (PEARO)

- 12 members
- 2.5km / 90 levels
- 09 and 21 UTC
- 45h forecast range
- Operational status expected for end 2016
- Figure: added value of PEARO with respect to global EPS (PEARP)



Brier Skill Score, added value of PEARO (blue line) versus PEARP (global system, red line) : threshold event is RR > 1mm/6h, computed over 302 instances of the EPS systems (Dec. 2015 - Oct. 2016). The higher the Brier Skill Score is, the better the probabilistic system performed for that event.

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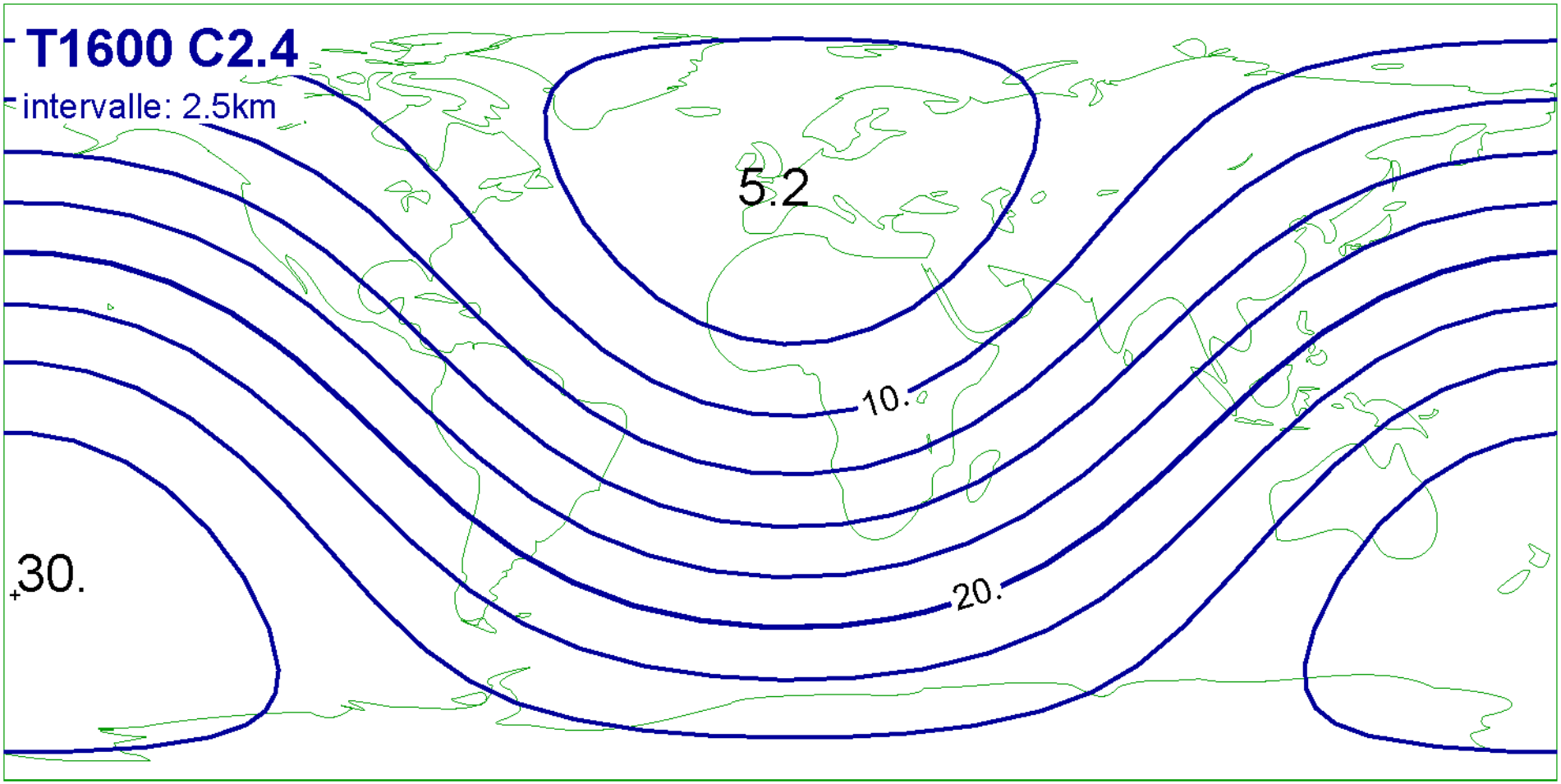
Outlook : 2017-2018

- AROME-EDA
- AROME-EPS and ARPEGE-EPS 4 times/day
- New horizontal resolutions for ARPEGE (about 5km over Western Europe), as well as global EDA and EPS systems



Outlook : longer term (2017 and beyond)

- Physics : new surface schemes in SURFEX, 2 moments microphysics scheme “LIMA”, coupling with ocean and wave models, etc.
- DA : EnVar data assimilation, with major contributions to OOPS
- Observations: improved assimilation of aircraft data, satellite radiances (all-sky), add Lidar winds, European radar data (OPERA)
- Expect a long lasting effort of recoding the NWP system (OOPS, COPE, ESCAPE aspects) => likely to continue to experience fairly complex common code udpates (phasing)

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Outlook : next HPC (2019)

- MF aims at upgrading its HPC system in 2019
- Preparations have started, including discussions with governmental bodies
- Open scenarios depending on the factor of HPC increase :
  - (* 2.5) : increase of compute power would be mostly dedicated to improvements in DA (4DEnVar?)
  - (*5) : increase would be mostly dedicated to DA as well as increasing the resolutions of the EPS systems, to the same level as the deterministic systems (both ARPEGE and AROME)

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Thank you for your attention !