

# Future observations from EUMETSAT: How will they serve the SRNWP community ?

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**METEO FRANCE**  
Toujours un temps d'avance

# Outline

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- Needs of satellite data for SRNWP
- Current practice at Météo-France (AROME 3D-Var)
- New satellites proposed by EUMETSAT and ESA
- Questions for the discussion

# Needs of satellite data for SRNWP (1)

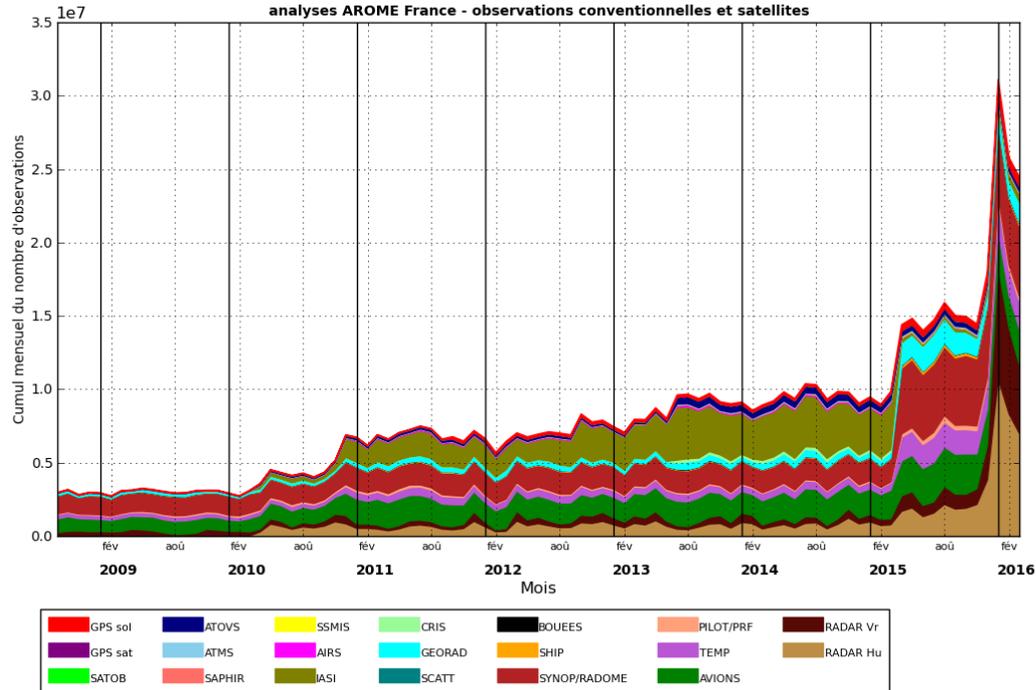
- Measurements (and assimilation) are needed at high spatial (< 10 km) and temporal resolutions (10 min -> 1h)
- Short assimilation cut-off times (nowcasting) => very stringent latency requirements (~ few minutes) => importance of local data processing
- Importance of GEO satellites but LEO play an important role at high latitudes (> 50°N) – constellations can improve the revisit time (e.g. GPM concept)
- For high impact weather => surface conditions and boundary layer
- Need to describe horizontal and vertical gradients of wind, temperature and humidity
- Cloud information should also be extracted from satellite data (macro-structure and micro-physics) -> model physics complexity ?

## Needs of satellite data for SRNWP (2)

- New information to consider with coupled systems : aerosols ? LST ?
- Extraction of information from time sequence of satellite images
- Need to define suitable metrics for the evaluation the impact of satellite data in SRNWP
- Importance of accounting for model errors for optimal extraction of information
- Use of satellite data for model validation
- Risk of being overwhelmed by data volumes => need for information compression

# The observing system in AROME

Evolution des cumuls mensuels de nombre d'observations utilisées par type d'observation



DirOP/COMPAS 02-avril-2016

Change of paradigm in 2015 :

-> model top at 10 hPa: all peaking up channels from IASI are gone

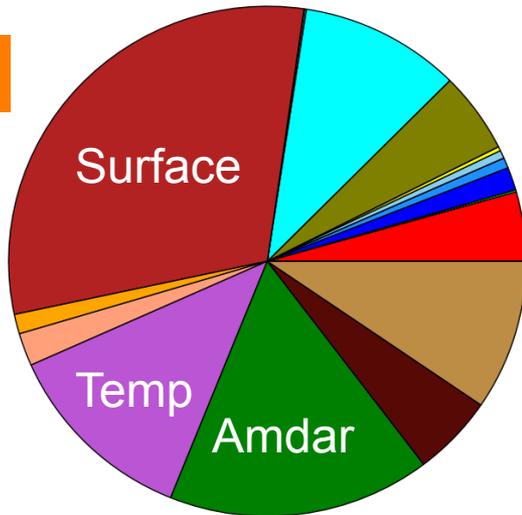
-> 1h assimilation cycle: importance of GEO, SYNOP, TEMP, AMDAR, RADAR

-> thinning of radar data from 15 to 8 km: increase by a factor 4

# Observations and information content

Proportions des nombres d'observations utilisées par type d'obs  
analyses cut-off AROME - AROME France dbl  
observations conventionnelles et satellites  
cumul du nombre d'observations utilisées sur la période 2015120100 - 2015120123 : 531721

Number

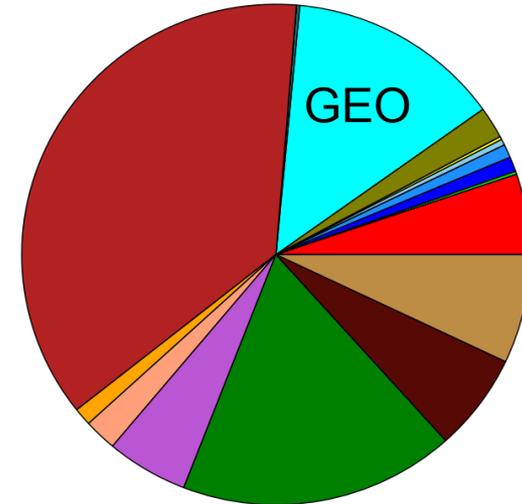


GPS ground	4.39%	SSMIS	0.27%	SYNOP/SYNOR/RADOME	30.62%
GPS sat	0.00%	GMI	0.00%	SHIP	1.25%
SATOB	0.14%	AIRS	0.00%	PILOT/PRF	2.08%
ATOVS HIRS	0.00%	IASI	5.13%	TEMP	12.23%
ATOVS AMSU-A	1.45%	CRIS	0.00%	ATRCRAFTS	16.43%
ATOVS AMSU-B	0.66%	GEORAD	10.05%	RADAR Vr	5.14%
SAPHIR	0.00%	SCATT	0.13%	RADAR Hur	9.53%
ATMS	0.51%	BUOY	0.01%	BOGUS	0.00%

Satellite data = 16 %  
(10 % GEO + 6 % LEO)

Part des DFS par type d'obs  
analyses cut-off AROME - AROME France dbl  
observations conventionnelles et satellites  
cumul du DFS sur la période 2015120100 - 2015120123 : 149861

DFS



GPS ground	5.21%	SSMIS	0.21%	SYNOP/SYNOR/RADOME	36.95%
GPS sat	0.00%	GMI	0.00%	SHIP	1.14%
SATOB	0.19%	AIRS	0.00%	PILOT/PRF	2.08%
ATOVS HIRS	0.00%	IASI	2.05%	TEMP	5.21%
ATOVS AMSU-A	0.95%	CRIS	0.00%	ATRCRAFTS	17.55%
ATOVS AMSU-B	0.86%	GEORAD	13.64%	RADAR Vr	6.31%
SAPHIR	0.00%	SCATT	0.21%	RADAR Hur	7.04%
ATMS	0.38%	BUOY	0.01%	BOGUS	0.00%

Satellite data = 19 %  
(13 % GEO + 6 % LEO)

One day without strong rainy events

# What will arrive soon from Europe ?



## ADM-AEOLUS 2017

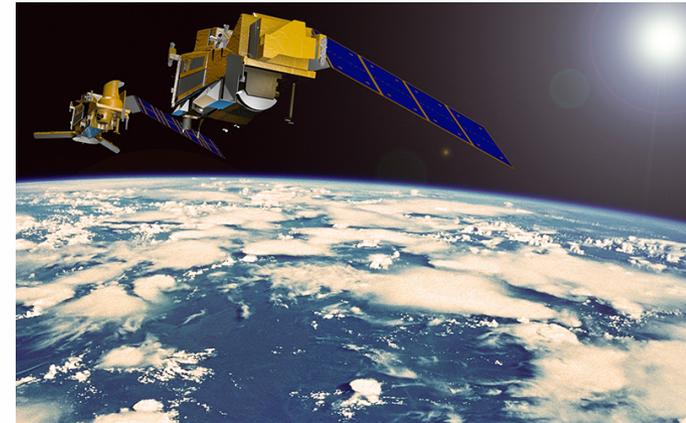
Need for local processing to get L2B HLOS winds in SRNWP



## MTG-I 2020 MTG-S 2021

Main challenge : IRS => PC or L2

New instruments : FCI and LI : how to use them ?



## METOP-SG A+B (2021+22)

IASI-NG

SCA

MWS

MWI + ICI

RO

Heritage : IASI, ASCAT, MHS, SSM/I

New instruments : ICI (ice clouds in the MW at high resolution) – SCA (improved info on strong winds)

Usefulness of data from Sentinel ? SAR winds ? LST ?

# Questions

- How to best address the main SRNWP issues for future satellite observation usage : timeliness and data volumes ?
- What shall be the effort on satellite data with respect to other observing systems for SRNWP ?
- What will be the role of EUMETSAT SAFs in CDOP-3 to help the SRNWP community for the preparation of new satellites (MTG and METOP-SG) ?
- What shall be the balance between an improved usage of data from existing satellites (window channels -> surface, clouds, precipitation) and the preparation of new instruments (e.g. MTG/IRS or LI - METOP-SG/IASING or ICI) ?
- How to increase information on the dynamics from the satellite observing systems ?
- How to prepare the assimilation of satellite observations relevant to Earth modelling systems ?
- Where should be the priority of DA system improvements (correlated obs errors, EnVar, flexible obs operator, ...) ?

Thank you for your attention !

