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# HAIC-HIWC Science Meeting

SP3: SPACE-BORNE OBSERVATION & NOWCASTING  
OF HIGH IWC REGIONS

# Content

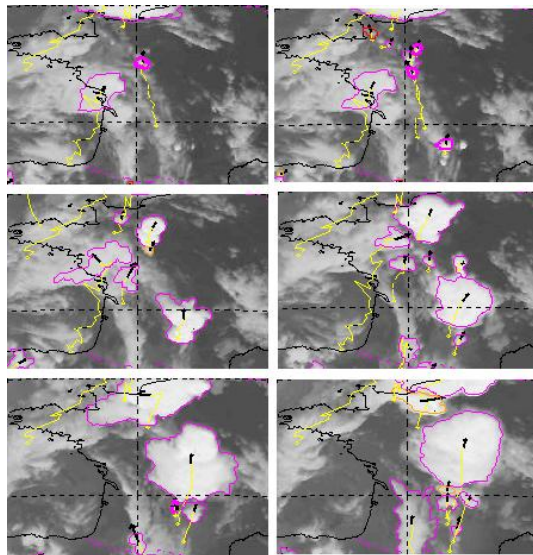
- Activity Overview
- General Observational-based Strategy
- Analysis of the HAIC/HIWC 2014 Darwin Campaign
- The KNMI High IWC Mask
- The RDT Operational Chain for the 2015 Cayenne Campaign
- Cross-comparison and Signature Investigation
- Way Forward

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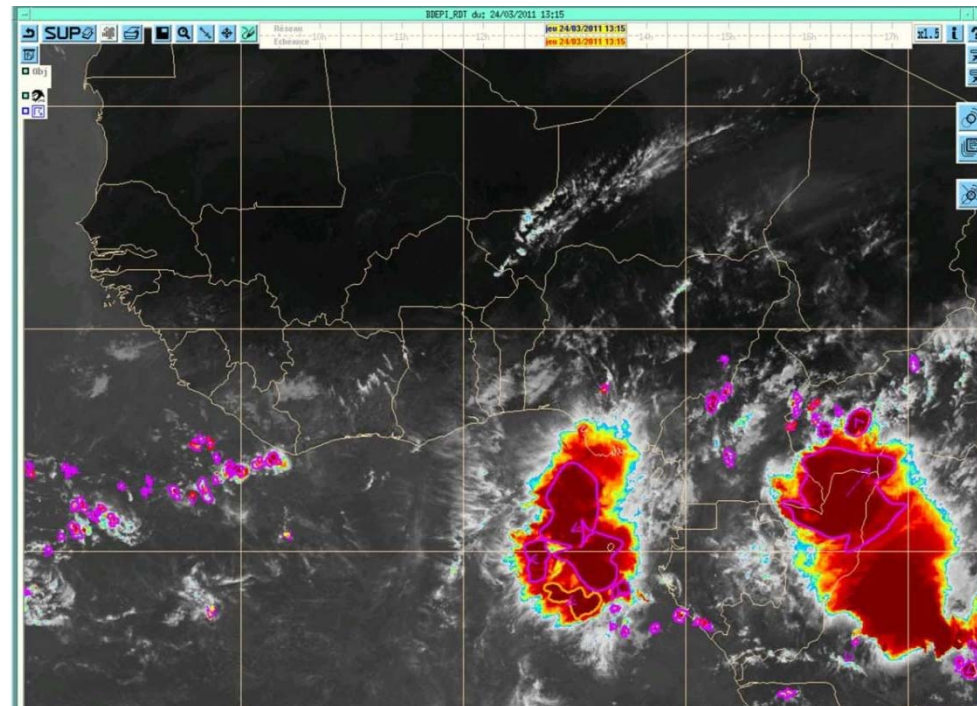
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# Activity Overview

- To develop **space-borne remote detection and nowcasting techniques of high IWC** to support the second and third HAIC flight test campaigns, and to ultimately provide near real-time weather data through ATM as being studied as part of SESAR



**Mosaic of RDT cells  
over France (from top  
left to bottom right)**

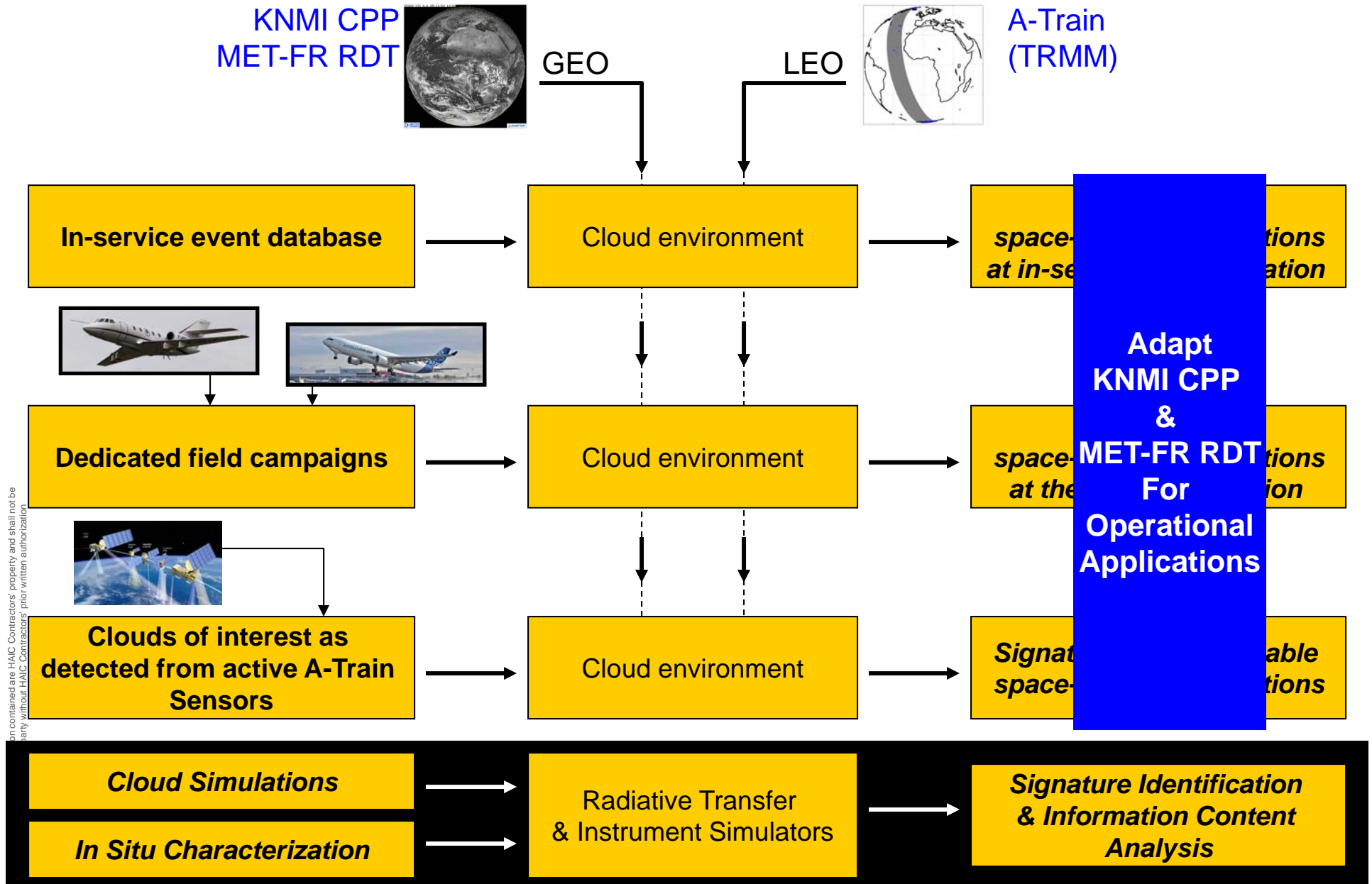


**Deep tropical convective supercells  
processed by RDT**

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# General Observational-based Strategy



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# HAIC/HIWC 2014 Darwin Campaign

## MTSAT / RASTA Analysis (1/2)



### Instrumentation :

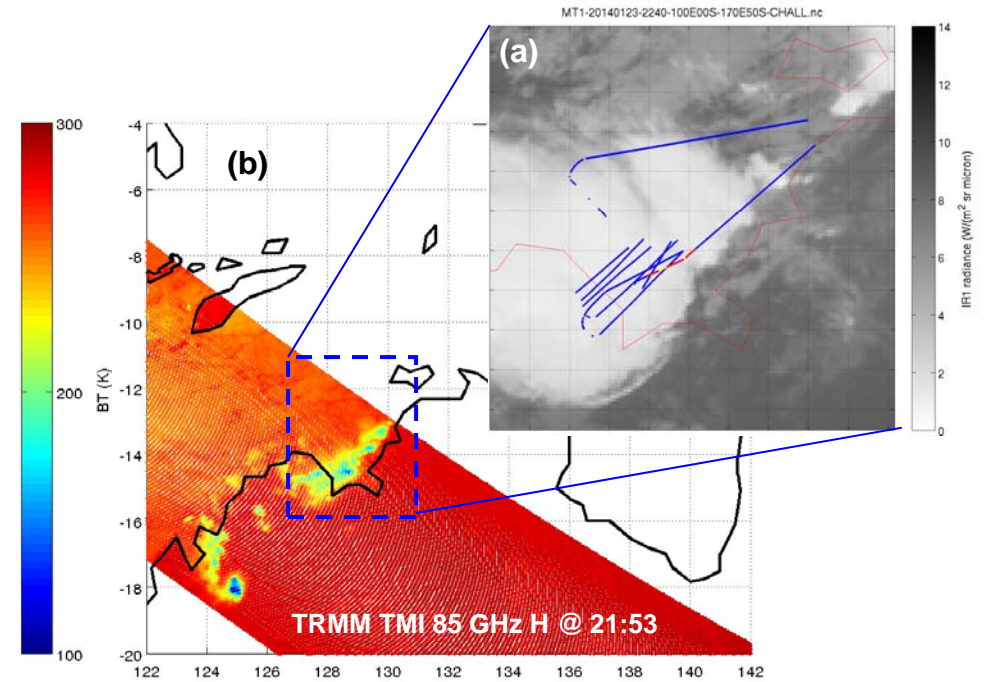
- Products of RASTA cloud radar
- 10-min rapid scan GEO MTSAT
- Available LEO observations

### Census of the cases completed

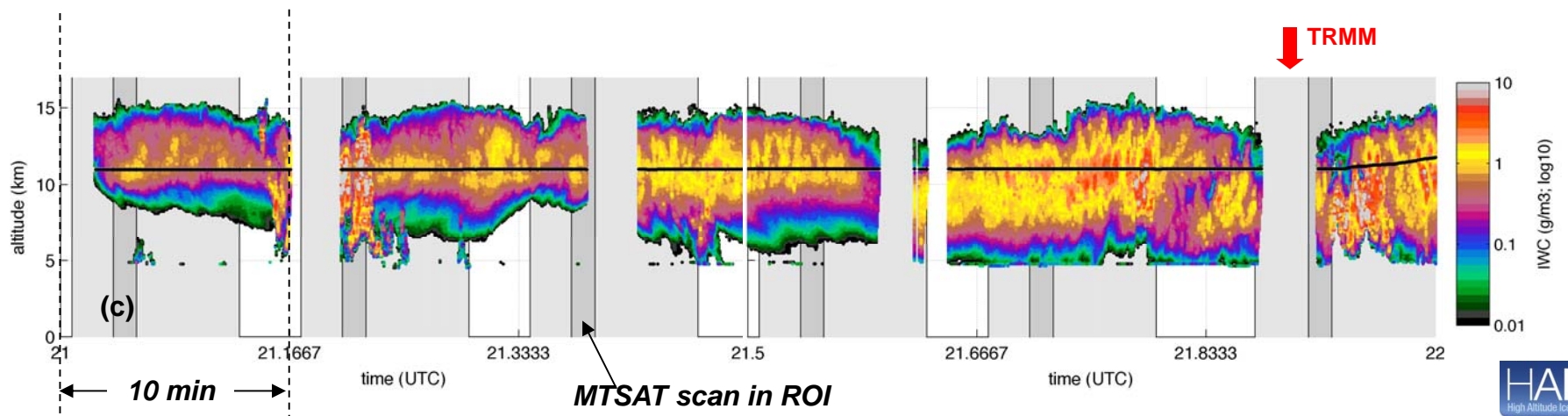
### Flight F06 presented here:

- F20 @ 10.3, 11.9 and 9.4 km height
- Mature convective system in dissipation stage
- TWC @ F20 level up to  $1 \text{ g/m}^3$

### Coincident TRMM / RASTA / MTSAT observations



property and shall not be written authorization





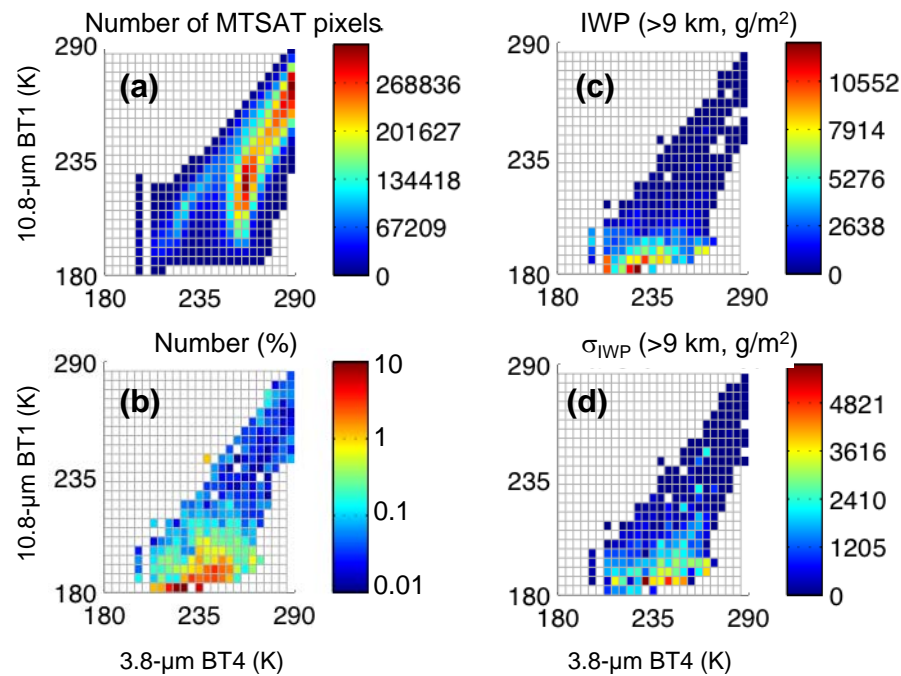
# HAIC/HIWC 2014 Darwin Campaign

## MTSAT / RASTA Analysis (2/2)

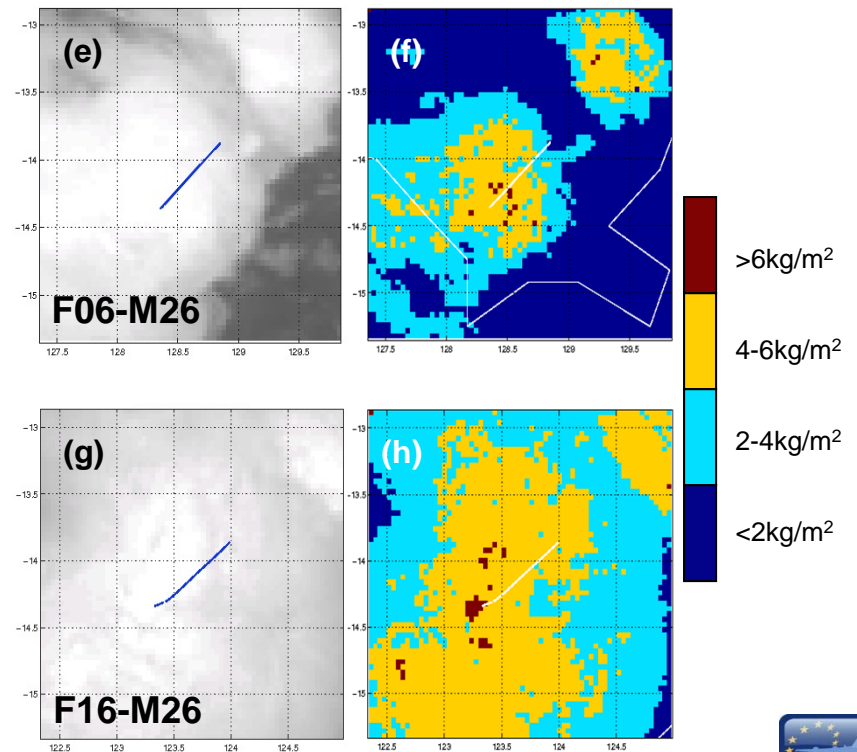


- Characterization of the MTSAT radiances
- Exploring the potential of an IR-based neural-network (NN) algorithm for RASTA-based IWP detection and quantification

*RASTA sampling in BT domain (16 flights)*  
*[IWP computed for  $Z > 9$  km]*



*Preliminary results on HAIC IR-NN retrieval*  
*[NN built from RASTA\_IWP $_{>9\text{km}}$  and MTSAT IR radiances]*



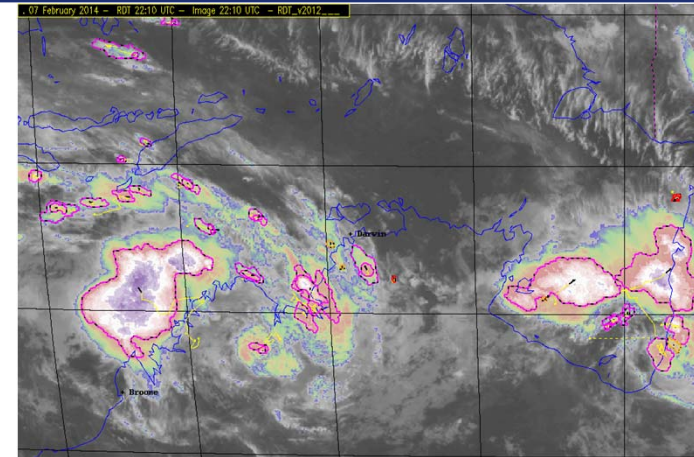
# HAIC/HIWC 2014 Darwin Campaign

## Investigating RDT performances



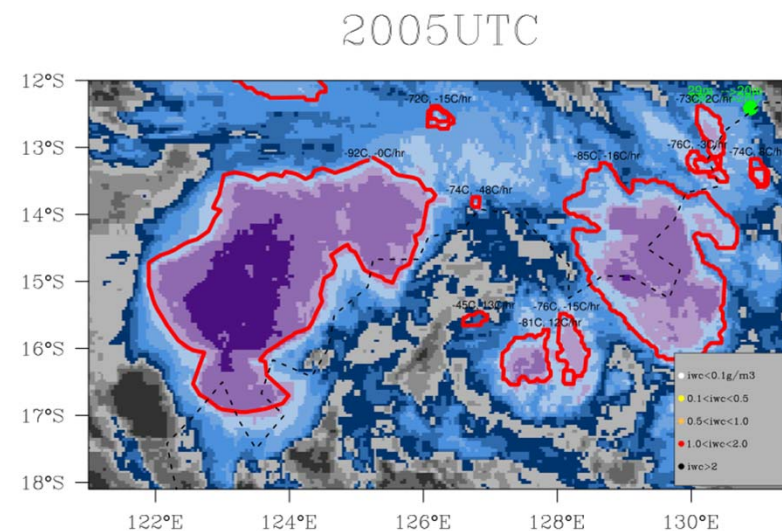
- **A Near Real-Time Detection of Convective Areas**

- ▶ To detect and track convective systems based on analysis of IR images from geostationary satellites



- **Evaluation of RDT performance using in-situ measurements of IWC**

- ▶ RDT has properly detected areas of convection associated with high IWC for most of cases



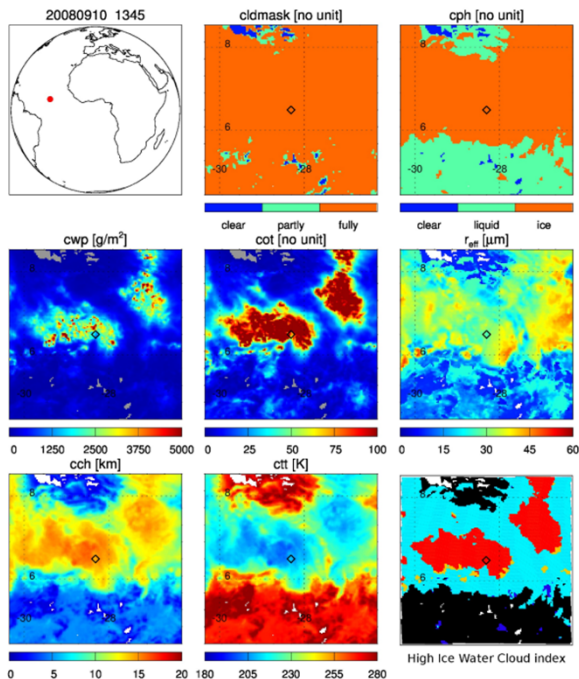
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# KNMI High IWC Mask Development

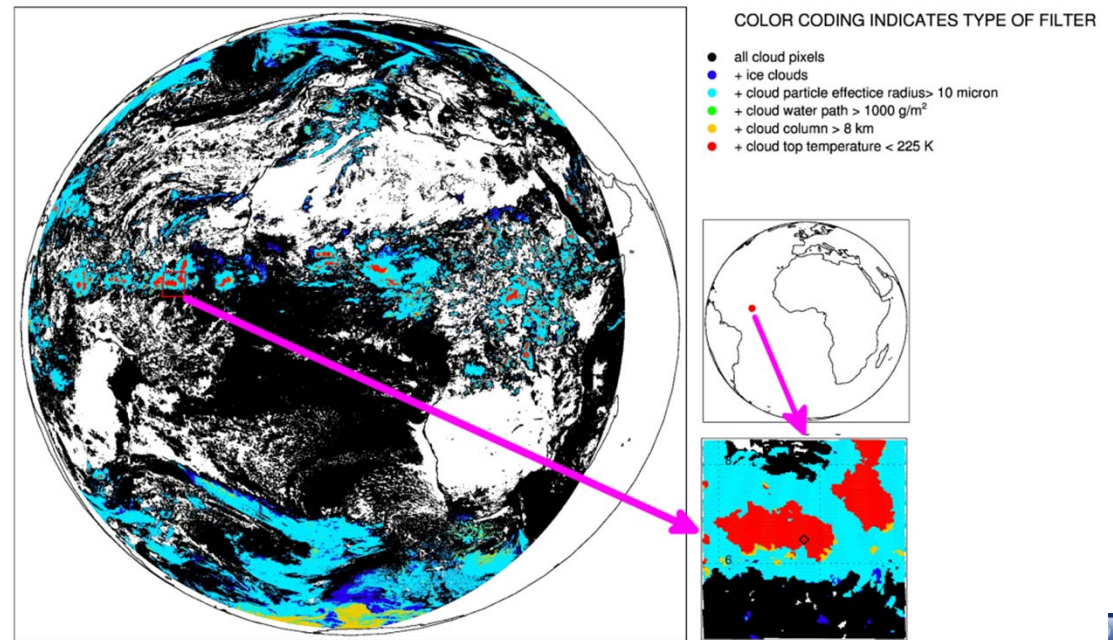
- First version of the MSG-CPP retrieval algorithm
- High IWC mask developed based on analysis of in-service events database
- Validation underway through cross-comparison with A-Train observations, past and up-coming airborne campaigns

Example of MSG-CPP data  
(in-service event)



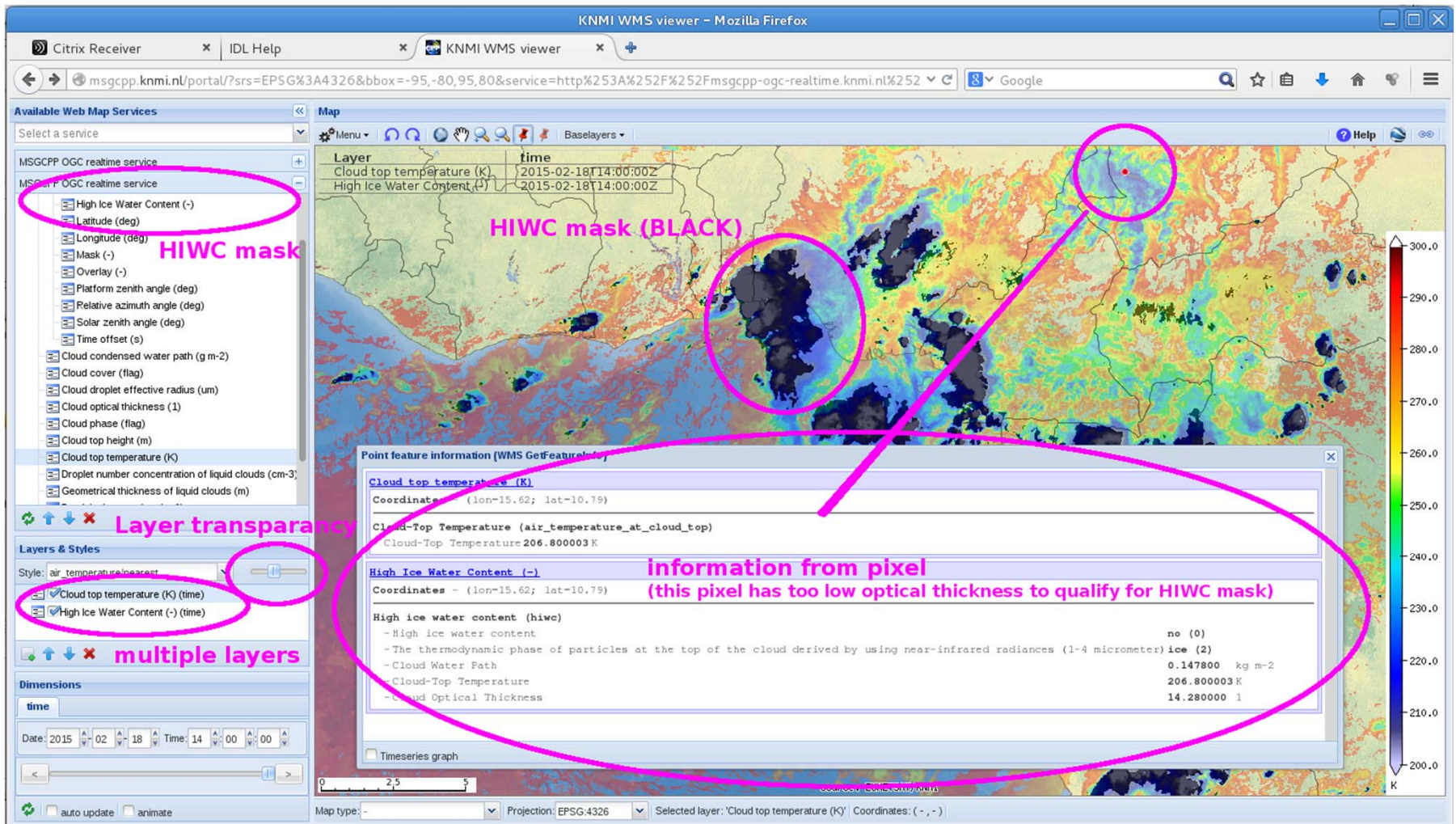
Example of MSG-CPP High IWC mask

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# KNMI High IWC Mask

## Pre-operation High IWC Mask in MSG-CPP Web Portal



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# RDT Operational Chain

## Support to the HAIC/HIWC 2015 Cayenne Campaign

Météo Guyane / Automatic Monitoring of Convective Systems

http://www.meteo.fr/special/PI/OPIC\_HAIC/20150303/201503031930/HaicCayenne/index.htm

Météo Guyane / Automatic Monit...

**METEO FRANCE**

**Automatic Monitoring of Convective Systems**

The product | Directions for use | FAQ | Contact | Links

Domains		
→	HaicCayenne	Animations : 3h 6h . complete - Day : other slots
→	Cayenne	Animations : 3h 6h . complete - Day : other slots

. 03 March 2015 - RDT 19:37 UTC - Image 19:30 UTC - RDT\_v2013\_...

Applet imap started

http://www.meteo.fr/special/PI/OPIC\_HAIC/

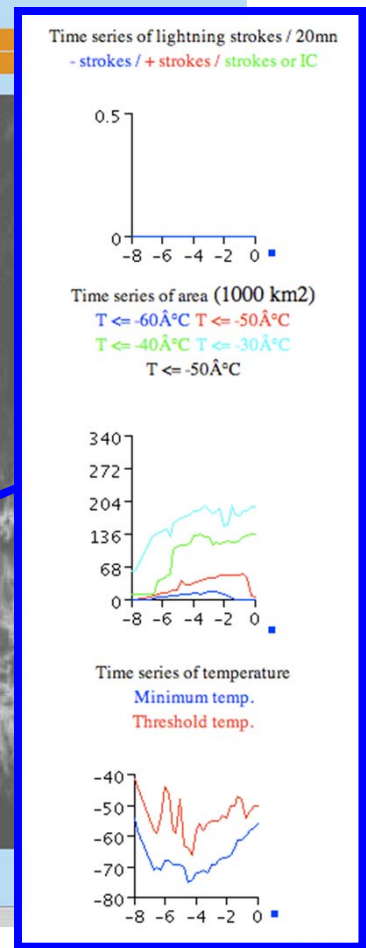
Trattoria ▾ Obspm ▾ Transports ▾ CNRS ▾ Biblio ▾ PNTS ▾ HyMeX ▾ EECLAT ▾

http://www.meteo.fr/special/PI/...

**HAIC (High Altitude Ice Crystal) project**  
**XPSP3 Cayenne experiment**  
*The RDT product (Rapid Developing Thunderstorm)*

Archive of daily RDT production :

[Tuesday 03 March 2015](#)  
[Wednesday 04 March 2015](#)



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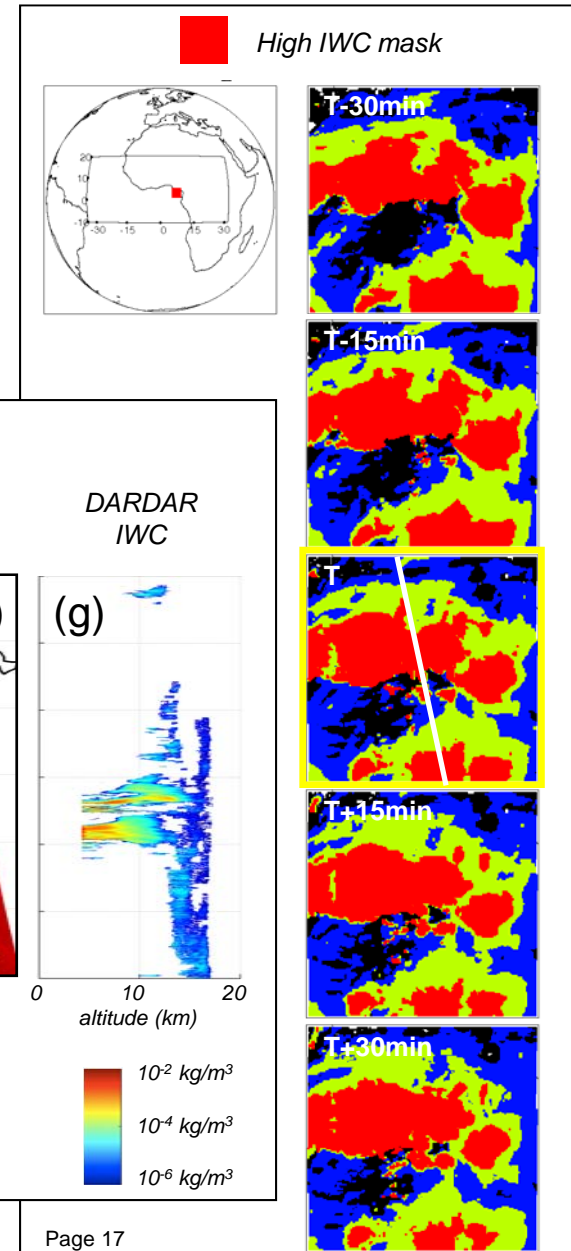
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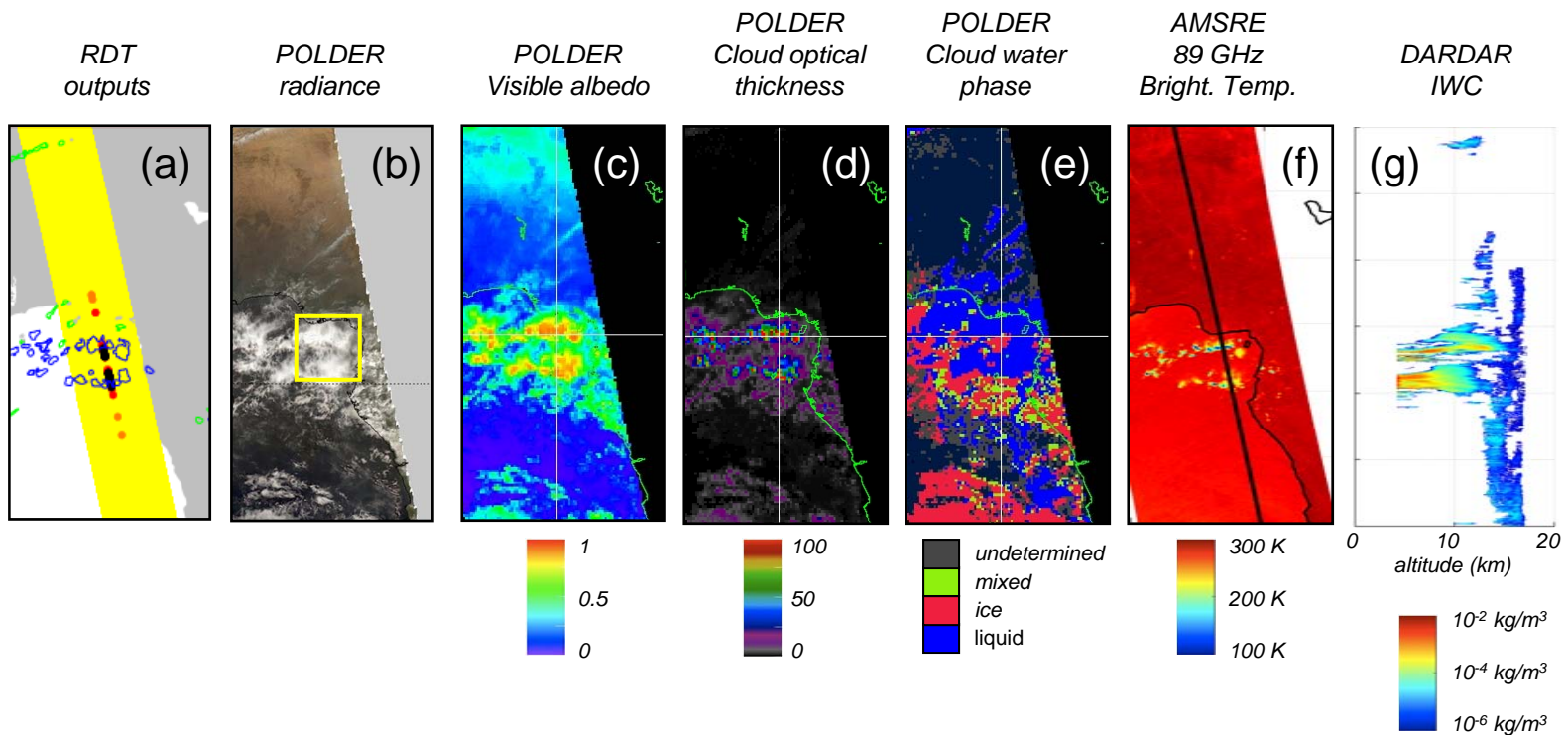


# High IWC Detection Cross-comparison and Signature Investigation

- Comparison of the RDT outputs and the High IWC mask relative to A-Train active (DARDAR product) and passive (POLDER; AMSRE) observations
  - Year 2008; day & night; SEVIRI coverage area



Case #03 : 2008/01/04 1315 (daytime)



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# Way Forward

- Support to HAIC/HIWC 2015 Cayenne campaign
- Pursue the on-going investigations on High IWC detection based GEO and LEO observations
  - ▶ Access performances/limitations of the different algorithms/tools
  - ▶ Explore synergetic use of temporally and spatially coincident space-based observations
- Perform a suite of validation exercises including HAIC, HAIC/HIWC and past Airbus field campaigns
  - ▶ Propose a validation strategy of High IWC space-based products for HAIC 2016 campaign
- Deliver a global scale climatology of High IWC events
- Interact with US partners
  - ▶ Dedicated workshop under discussion (teleconference scheduled for mid-March)

High Altitude Ice Crystals (HAIC, 314314)

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**EUROPEAN COMMISSION**  
European Research Area