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Meteorological Service of Canada Perspectives

presented to the

WMO Coordination Group on Satellite Data Requirements for RAIII/IV

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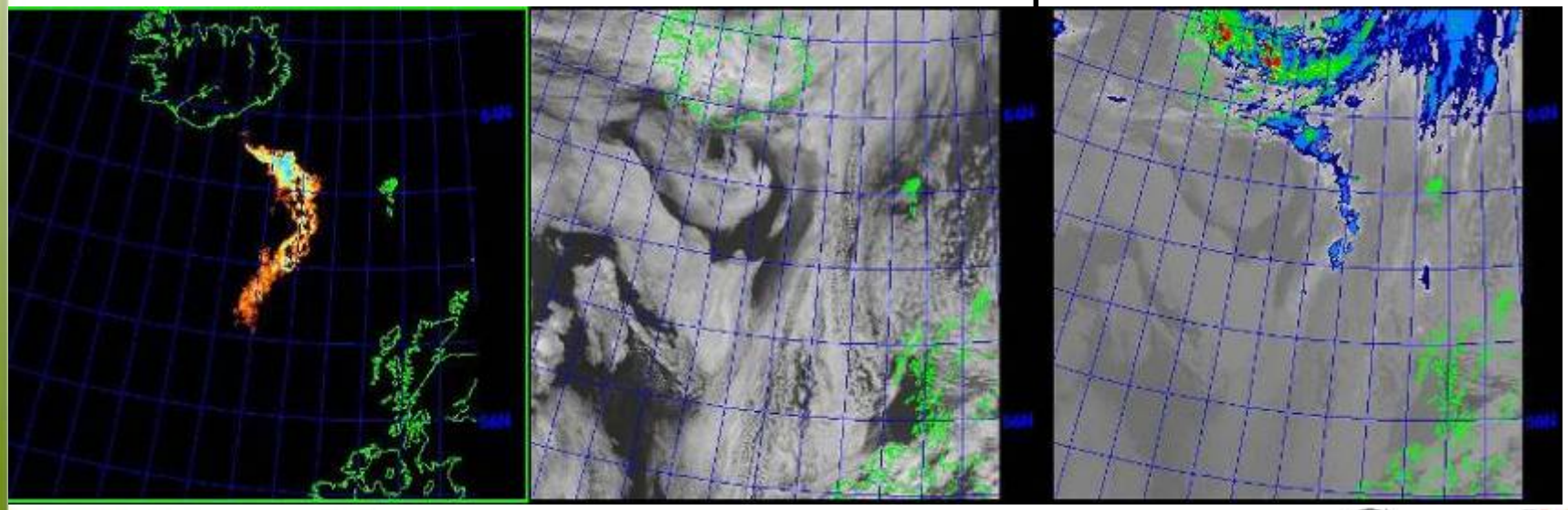
Topics

- Current and planned utilization of satellite data
- Details on data reception mechanisms currently used
- Needs for training and technical assistance
- Challenges
- Views on a standing Coordination Group for RA III/IV including potential for support

Current & Planned Utilization of Satellite Data

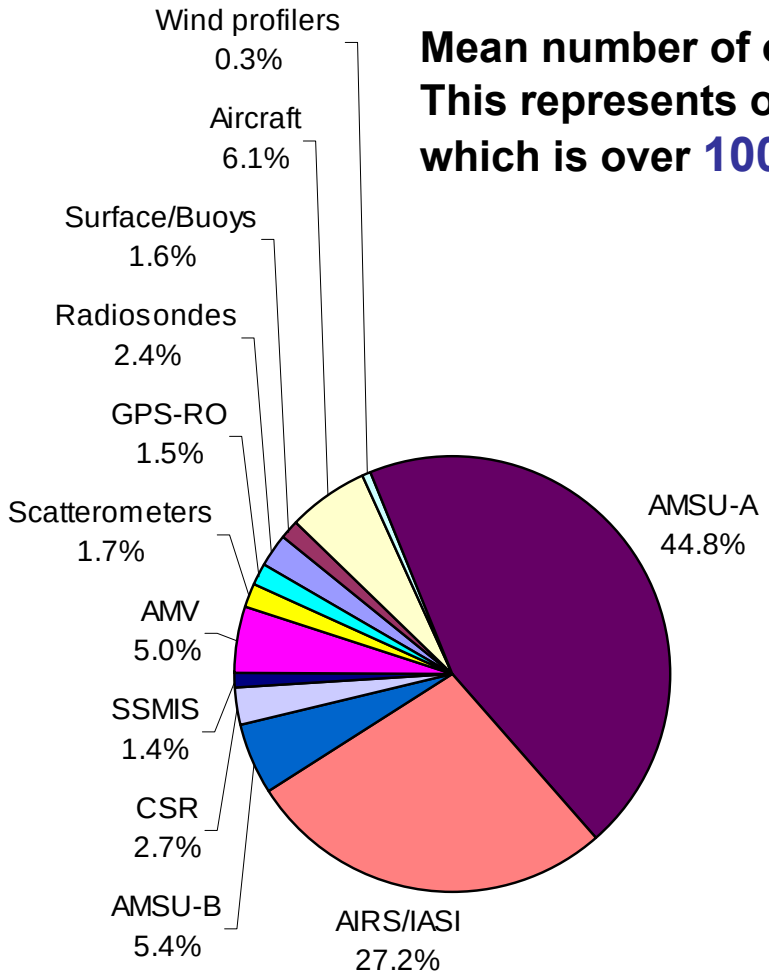
- Nowcasting/Forcasting (SPCs, CMACs and ADS)
- Ice monitoring (Canadian Ice Service)
- Volcanic ash monitoring (VAAC)
- Numerical Weather Prediction (EARS, CMC)
- WeatherOffice.gc.ca satellite pages
- + Non-real time research and development



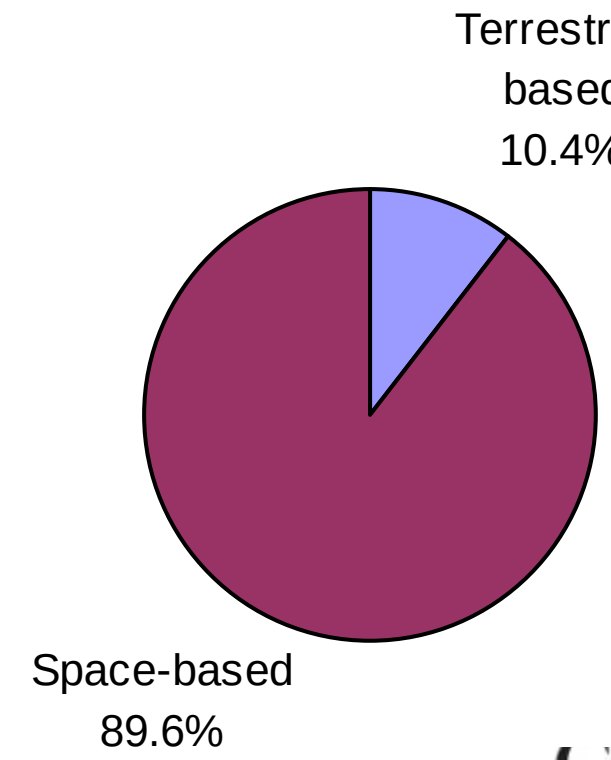
Current & Planned Utilization of Satellite Data (2)
-Currently Assimilated at CMC

Type	Variables			Thinning
Radiosonde/dropsonde	U, V, T, $(T-T_d)$, p_s			28 levels
Surface report (SYNOP, SHIP, BUOYs)	T, $(T-T_d)$, p_s, (U, V over water)			1 report / 6h
Aircraft (BUFR, AIREP, AMDAR, ADS)	U, V, T, (T-Td)			1^o x 1^o x 50 hPa per time step
ATOVS NOAA 15-16-18-19, AQUA, METOP-2 Global and RARS/EARS		**Ocean**	**Land**	150 km x 150 km per time step
	AMSU-A	**4-14**	**6-14**	
	AMSU-B / MHS	**2-5**	**3-4**	
Water vapor channel GOES-E / W METEOSAT 0° / IODC, MTSAT-2	WV ch (6.7 m)			1.5^o x 1.5^o 3-hourly
AIRS / IASI	**87 / 62 IR channels**			150kmx150km/time step
ASCAT	**U,V at 10 meter over ocean**			100kmx100km/time step
SSMIS DMSP-F16, F17, F18	**7 SSMI like channels**			150kmx150km/time step
AMV's (METEOSAT E-W, GOES E-W, MTSAT-2)	U,V (IR, WV, VI, **3.9μ** channels)			1.5^o x 1.5^o 11 layers, per time step
MODIS and AVHRR polar winds (Global & DB Aqua, Terra; NOAA 15-19, METOP-2)	U,V			~180 km boxes 11 layers, per time step
Profiler (NOAA Network)	U,V			(750 m) Vertical, hourly
GPSRO (COSMIC, GRACEA, METOP-2, TERRASAR-X)	Refractivity			830 m, per time step

Current & Planned Utilization of Satellite Data (3) -Observations Assimilated in the GDPS



Mean number of observations assimilated in 24h : 4 144 460. This represents only a few % of the data received at MSC which is over 100 million daily.



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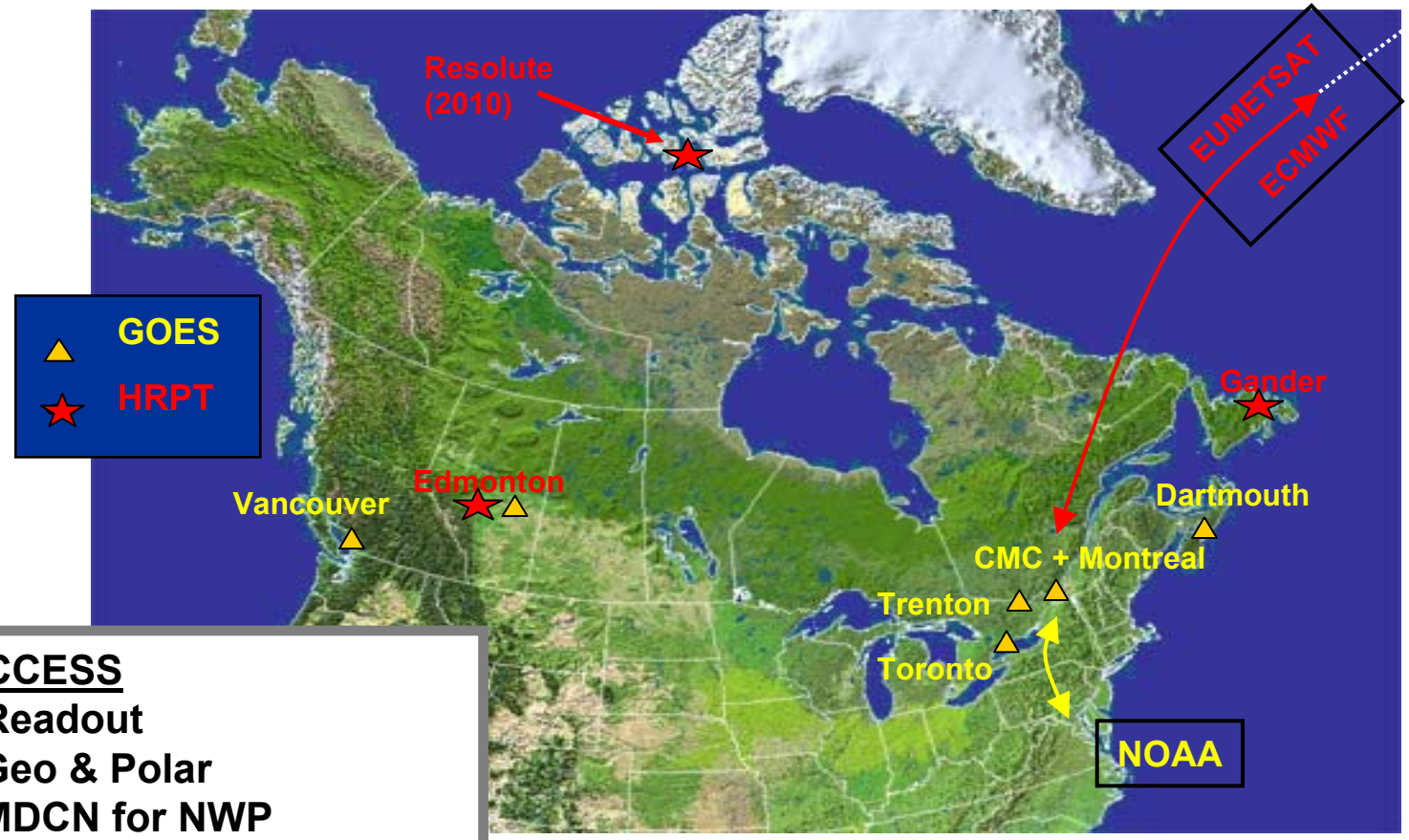
MSC Satellite Reception Network



DATA ACCESS

- Direct Readout
  - Geo & Polar
- GTS/RMDCN for NWP
- NOAA Dedicated Link
- Internet
- Other Canadian Gov't Depts (SAR, Landsat etc)

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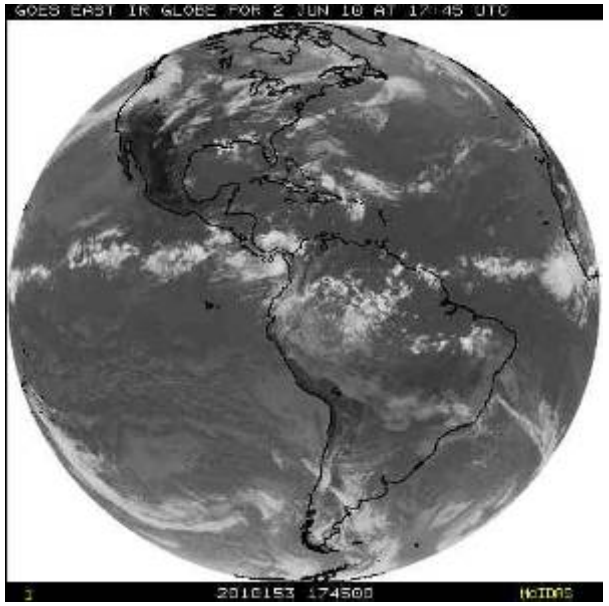
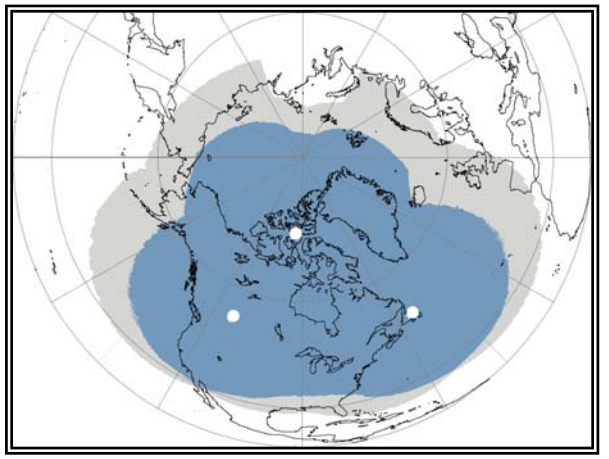
GOES Network

- Receives data broadcast from NOAA's Geostationary Operational Environmental Satellites (GOES)
- 6 GOES-East, 4 GOES-West stations
  - Regional products
  - CMC national backup
- Ground Station Infrastructure
  - 5.0 m fixed-direction antennas
  - Receiver, bit-synch, frame-sync and processing workstation provided by Global Image / Info-Electronics Systems
- Network Status: Stable and Healthy
  - Scheduled inspections of antennas
  - Regular processor upgrades
  - Highly available, redundancy through coordination



HRPT Network

- HRPT Stations in Gander, Edmonton (x2), Gander
- Satellites Tracked
  - NOAA POES: NOAA-15,16,~~17~~,18,19
  - EUMETSAT METOP-A,B
  - NPP, Terra & Aqua
- Ground Station Infrastructure
  - 2.4 m X-L Band tracking antenna inside a radome
  - Reception electronics and product generation from SeaSpace Corp. (Terascan)
  - New systems in Gander (2007), Edmonton (2009) and Resolute Bay (2010)
  - ~ 99% of planned acquisitions are successful
- **Provide data to EUMETSAT EARS Network**



Needs for Training and Technical Assistance

- Satellite Data Acquisition Systems;
  - Internal capacity & vendor training
- Satellite Data Use
  - Internally provided training to MT's
  - COMET Modules
- Visualization System / Tools
  - Internal training for NINJO
- ***Could use always more dedicated resources (people)***

The Challenges

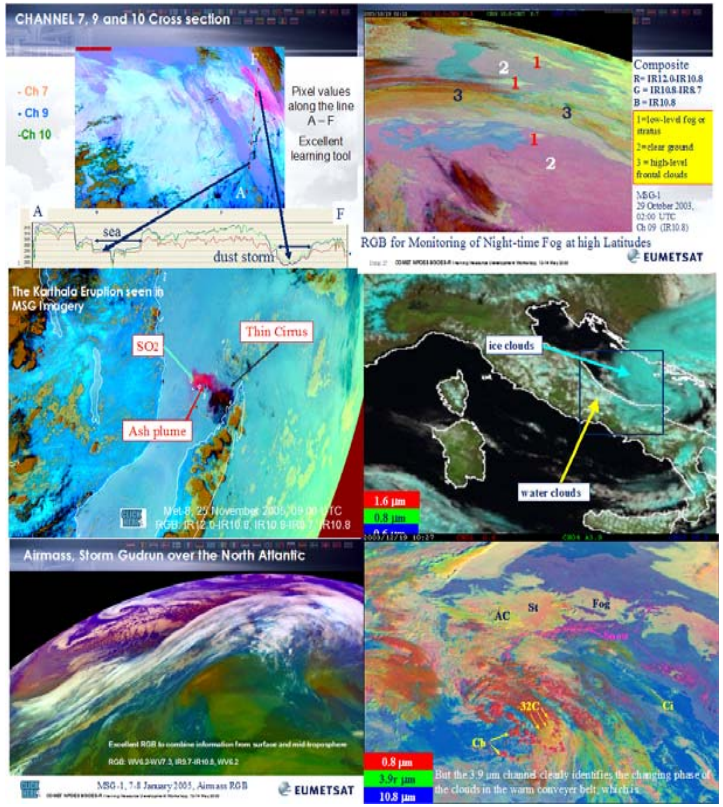
Data Access & Management

- Technical solutions for reception, processing, archive, distribution
- Gov't of Canada coordination established

-Reception Bandwidth
-Data volume

Resources for Data Exploitation

- Explosion of satellite data
- Increased data assimilation for NWP
- Improved visualizations and retrievals (NINJO)
- Satellite Products Working Group
    - Data and product requirements
    - Development & Transfer to Ops



Images courtesy of EUMETSAT