

Meeting the Observations & Information needs for Transport Services

-WIGOS contributing to Transportation services

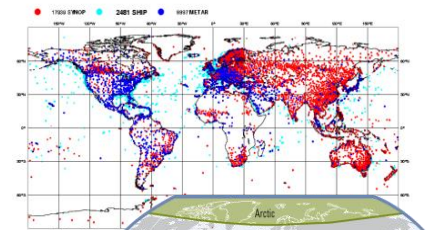
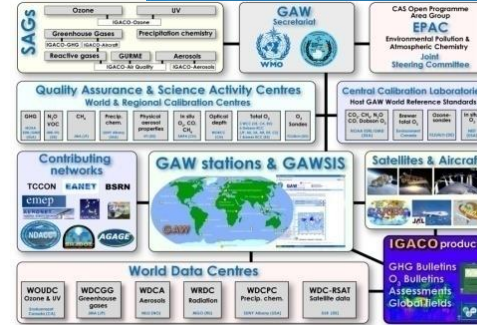
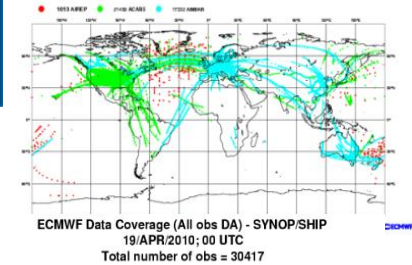
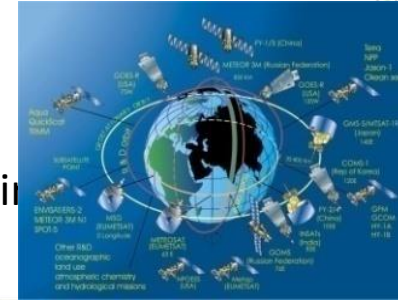
Dr W. Zhang

Director, Observing and Information Systems (OBS) Department, WMO

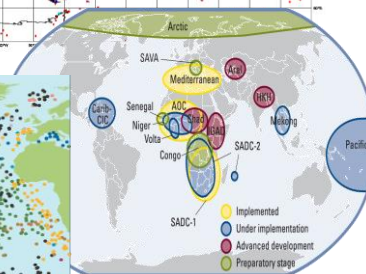
1. WMO INTEGRATED GLOBAL OBSERVING SYSTEM (WIGOS) – short introduction

WMO Global Observing Systems

- Global Observing Systems (WWW/GOS)
 - RBSN, RBCN (>10,000 stations, 1,000 upper-air)
 - AMDAR (39754/day)
 - Ship & Marine obs (30417/day)
 - Surface-based remote sensing (radars)
 - Meso-scale networks
- WMO Space Programme
- Global Atmospheric Watch (GAW)
- World Hydrological Cycle Observing System (WHYCOS)
- WMO Co-sponsored Observing Systems
 - GCOS, GOOS, GTOS



• AUSTRALIA (56)	• GERMANY (112)	• MAURITIUS (2)	• SPAIN (10)
• CANADA (75)	• INDIA (40)	• NETHERLANDS (3)	• UNITED KINGDOM (84)
• CHINA (11)	• IRELAND (1)	• NEW ZEALAND (5)	• UNITED STATES (923)
• EUROPEAN UNION (30)	• JAPAN (284)	• NORWAY (8)	
• FRANCE (112)	• KOREA (53)	• RUSSIAN FED. (4)	



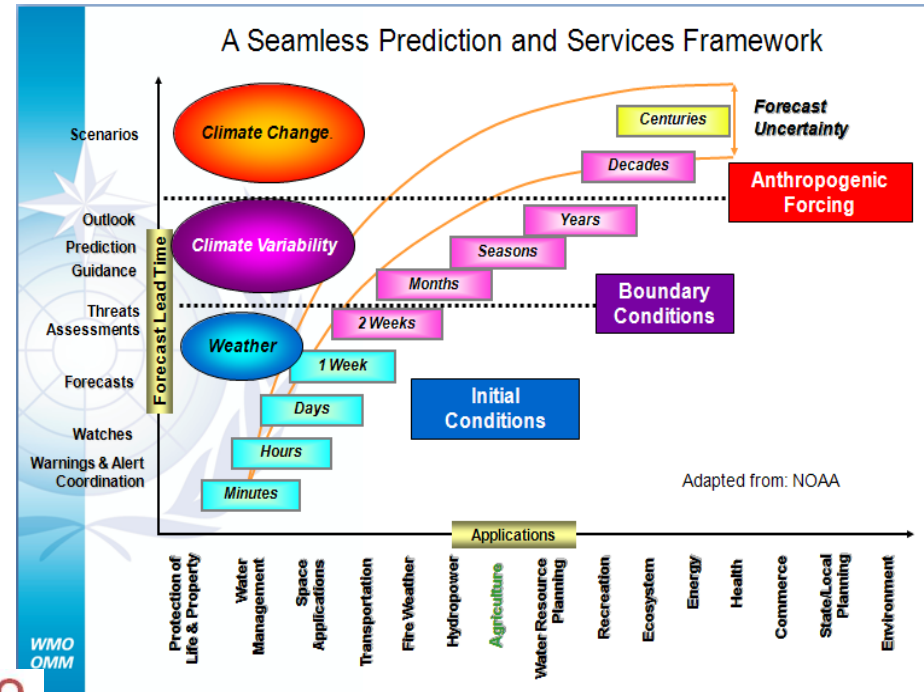
WIGOS: A future observing framework for WMO by integrating observing components



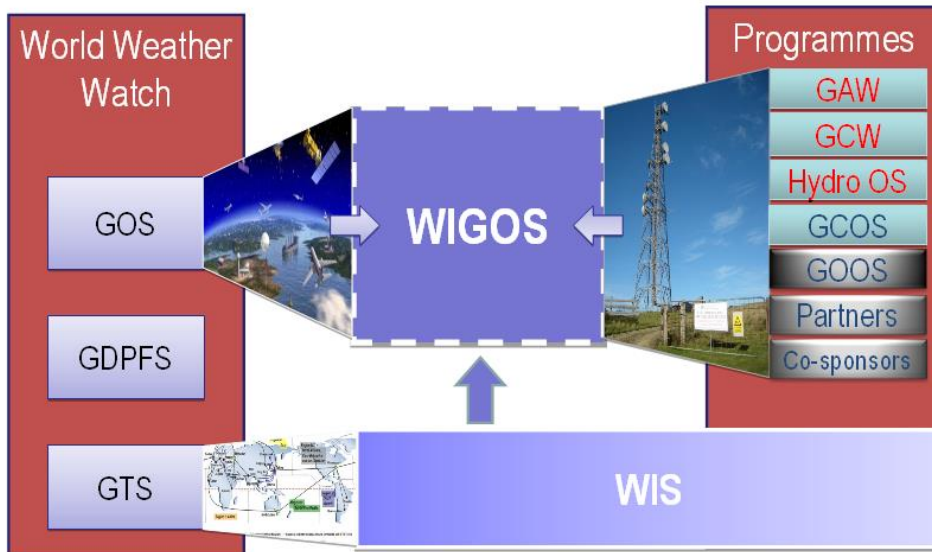
Cg-16 (2011) decided to Implement WIGOS

WMO INTEGRATED GLOBAL OBSERVING SYSTEM (WIGOS)

The whole is more than the sum of the parts—Aristotle



WIGOS: A future observing framework for WMO



Need an Integrated Global Observing System to meet all requirements in a cost-effective manner

EC 64 (2012) approved WIGOS Framework Implementation Plan (Global plan)

CONTENTS

1. Introduction and Background
 2. **Key Activity Areas for WIGOS Implementation**
 3. Project Management
 4. Implementation
 5. Resources
 6. Risk Management
 7. Outlook
- Annexes

KEY ACTIVITY AREAS

- 1) Management of WIGOS implementation (EC, RAs, TCs, ICG)
- 2) Collaboration with WMO and co-sponsored observing systems
- 3) Design, planning and optimized evolution
- 4) Integrated Observing System operation and maintenance
- 5) **Integrated Quality Management**
- 6) **Standardization, system interoperability and data compatibility**
- 7) The WIGOS Operational Information Resource
- 8) Data and metadata management, delivery and archival
- 9) Capacity development
- 10) Communication and outreach

WIGOS Framework: Key activity areas

Management of WIGOS Implementation

Collaboration with co-sponsors and partners

To oversee, guide and coordinate WIGOS

Data discovery, delivery & archival

To ensure supply of and access to WIGOS observations

Observing system operation & maintenance



To plan, implement and evolve WIGOS component systems

Design, planning and optimised evolution

Capacity Development

To facilitate and support the operation of WIGOS

Communications and outreach

Operational Information Resource

Standards, interoperability & compatibility

Quality Management

- Demo Benefits

**Governance &
Management**

**Phase II Regulatory
Material (Manuals,
Guides, ..)**

- Capacity
- Regional
Centers

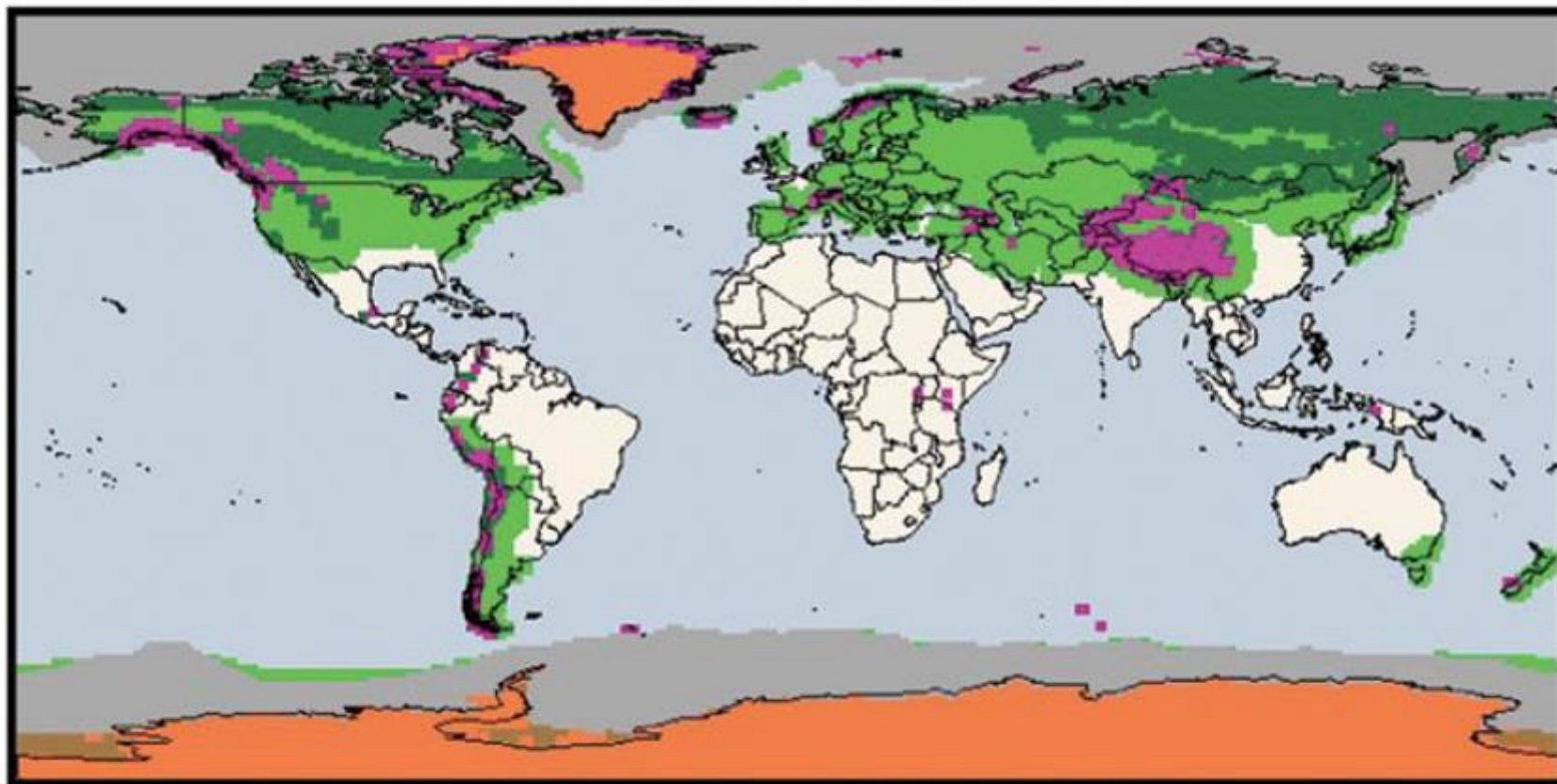
**WIGOS
Information
Resource**

**Monitoring
data/products quality
availability**



2. Cryosphere transportation issues

Global Cryosphere by Type



Glacier



Ice Sheets



Ice Shelves



Sea Ice



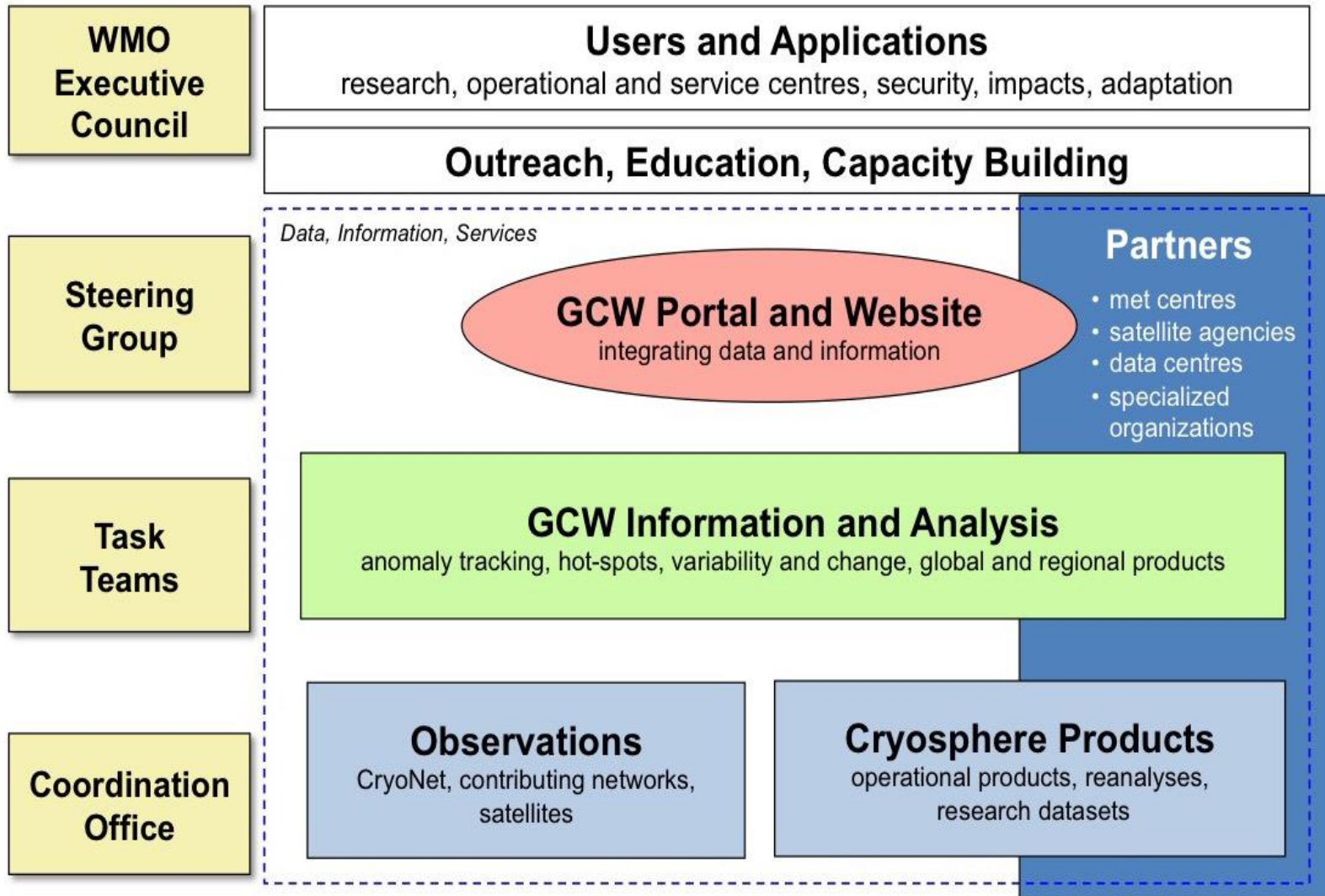
Permafrost



Snow Cover

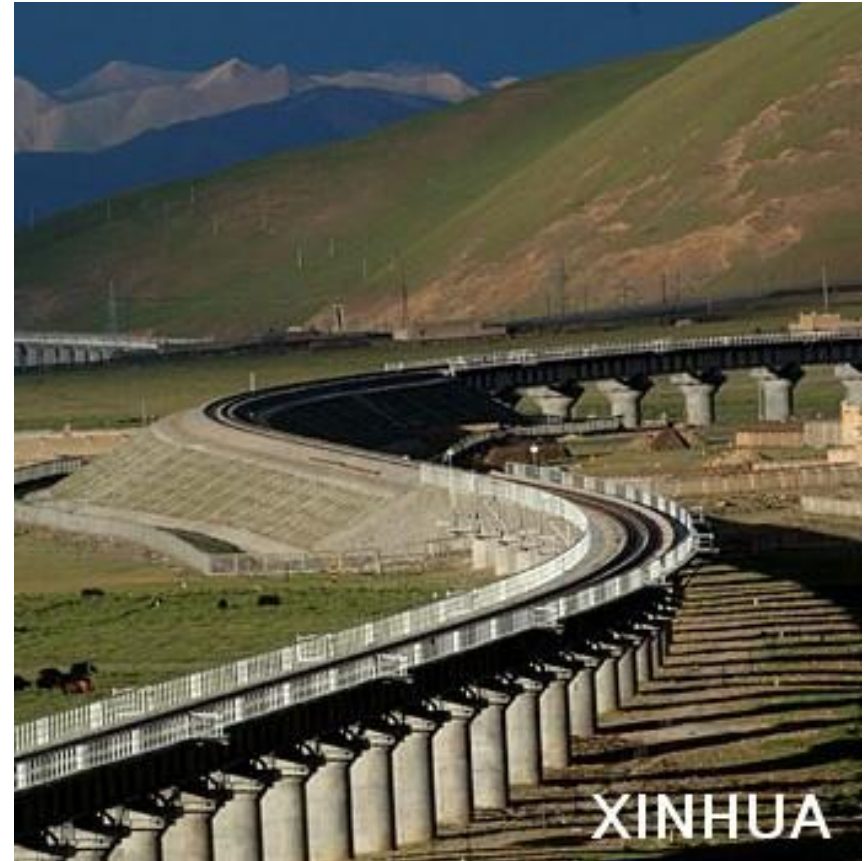


Introduction to GCW



For railways

- Transportation is directly impacted by changes in snow cover, fresh-water and sea ice extent and thickness, and the degradation of permafrost. Persistent reductions in Arctic multi-year sea ice cover would benefit marine transportation and related socio-economic developments, but present a risk for marine ecosystems.
- Thawing of permafrost can lead to the degradation of roads, railroads and northern airstrips. Snowfall frequency and magnitude directly affect road and rail traffic and aircraft operations with significant cost implications to national economies. River and lake-ice provide winter roads for access to remote areas.



For surface at cold region

- The design of road, buildings and infrastructure in cold climates must consider the presence of permafrost and seasonally frozen ground. Knowledge of thermal and ground ice conditions is critical for land use planning and engineering design in permafrost regions.
- The development of oil and gas deposits in ice-covered seas and shelves depends on the ice regime and the presence of icebergs, which together determine the economic feasibility of exploration and production projects.



Importance of GCW to weather & climate services, including transportation services

- Cryosphere data and products support the development and delivery of climate, weather and water services by Members, including in the key GFCS areas of food security, water, health, and disaster risk reduction. Snow and ice data are required for weather and climate research and in many types of practical applications such as engineering, services to society, and various types of land- and marine-related resource.

For more information, see GCW website *globalcryospherewatch.org/* (home page)

World Meteorological Organization

Global Cryosphere Watch

Home About News Cryosphere Now CryoNet Satellites Activities Outreach Reference Search

Highlights

CryoNet Team meeting, Reykjavik, January 2014

GCW held a CryoNet Team meeting in Reykjavik, Iceland, January 2014. Site requirements were defined and initial sites were selected (to be approved by EC-PORS in February).

The first GCW Advisory Group meeting immediately followed the CryoNet meeting, and helped define the path forward for GCW.

(Photo by Lug Rasser)

Cryosphere in the News

RESEARCH: Arctic may warm 13 C by end of the century – study
Mon, 10 Feb 2014
eenews.net

Climate change: Weather of Olympian extremes | Editorial
Mon, 10 Feb 2014
feeds.theguardian.com

Retreating Alpine glacier gives up another body after 34 years
Sun, 09 Feb 2014
feeds.theguardian.com

Mapping the bathymetry of supraglacial lakes and streams on the Greenland ice sheet using field measurements and high-resolution satellite images
2014-02-06
the-cryosphere.net

Brief Communication: Further summer speedup of Jakobshavn Isbræ
2014-02-03

[More Cryosphere in the News »](#)

The Cryosphere Now

Sea and Freshwater Ice
Snow and Solid Precip
Glaciers & Ice Caps
Ice Sheets
Permafrost
Atmosphere
Satellite Products

Feb 08 2014 Antarctic
ASI (from AMSR2) ver. 5.2, Grid 6.25 km
Ice Concentration

GCW News and Highlights

Interim Advisory Group meeting in Reykjavik, 23-24 Jan 2014 (2014-01-09)

A CryoNet Team meeting, Reykjavik, 23-24 Jan 2014 (2014-01-09)

Asia CryoNet Workshop develops a foundation for unified measurements in the region (2013-12-10)

Successful WGMS Summer School (2013-11-27)

Barry Goodison awarded the 2012 Patterson Distinguished Service Medal (2013-06-17)

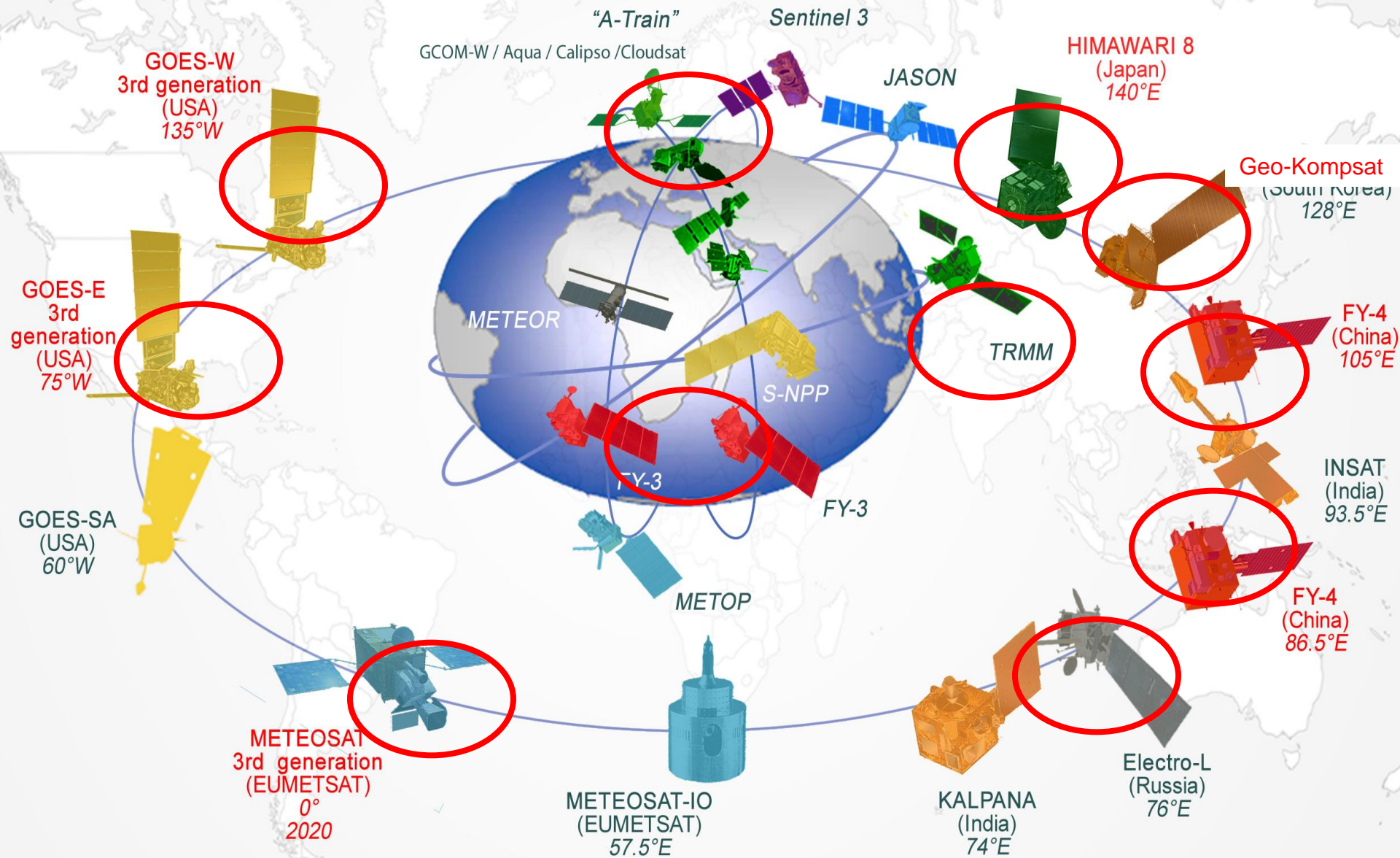
WGMS Summer School on Mass Balance Measurements and Analysis 2013, 2-7 September (2013-06-16)

[GCW News | Meetings | Calendar »](#)

Problem with website? Connect with us: Select Language This website is operated on behalf of WMO by SSEC. It is not an official

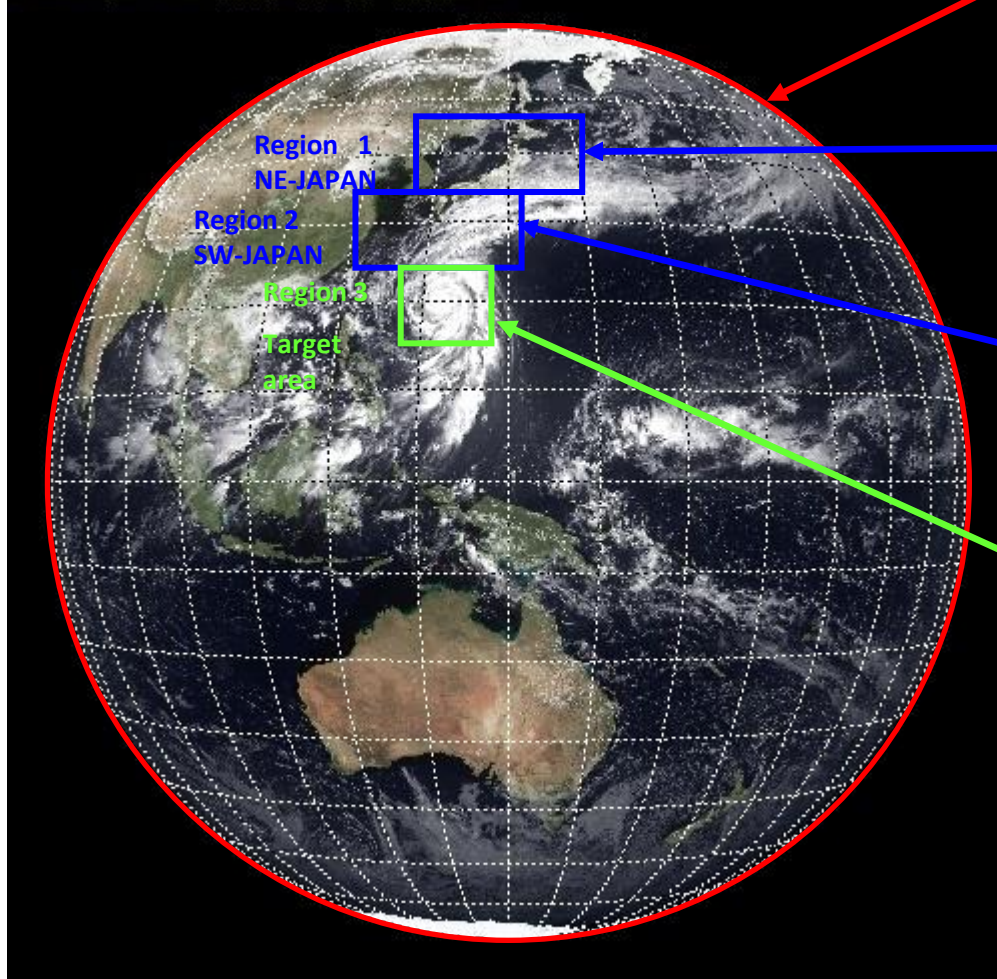
3. Satellite new observing capabilities
benefiting to land transportation

Next-generation geostationary constellation



Specification of Himawari-8/9

MTSAT-1R VIS 2008-05-11 0232UTC



Full disk

Interval : **10 minutes** (6 times per hour)

Region 1 JAPAN (North-East)

Interval : **2.5 minutes** (4 times in 10 min)

Dimension : EW x NS: 2000 x 1000 km

Region 2 JAPAN (South-West)

Interval : **2.5 minutes** (4 times in 10 min)

Dimension : EW x NS: 2000 x 1000 km

Region 3 Target Area

Interval : **2.5 minutes** (4 times in 10 min)

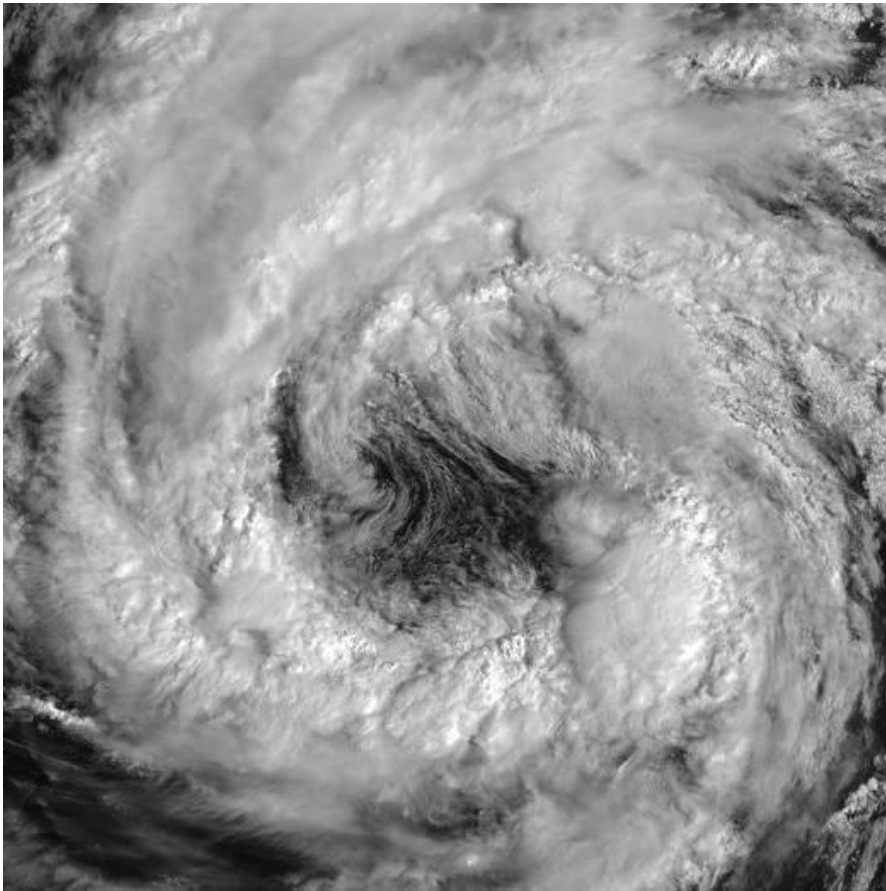
Dimension : EW x NS: 1000 x 1000 km

For southern hemisphere, interval will be improved from 60 min to 10 min !!

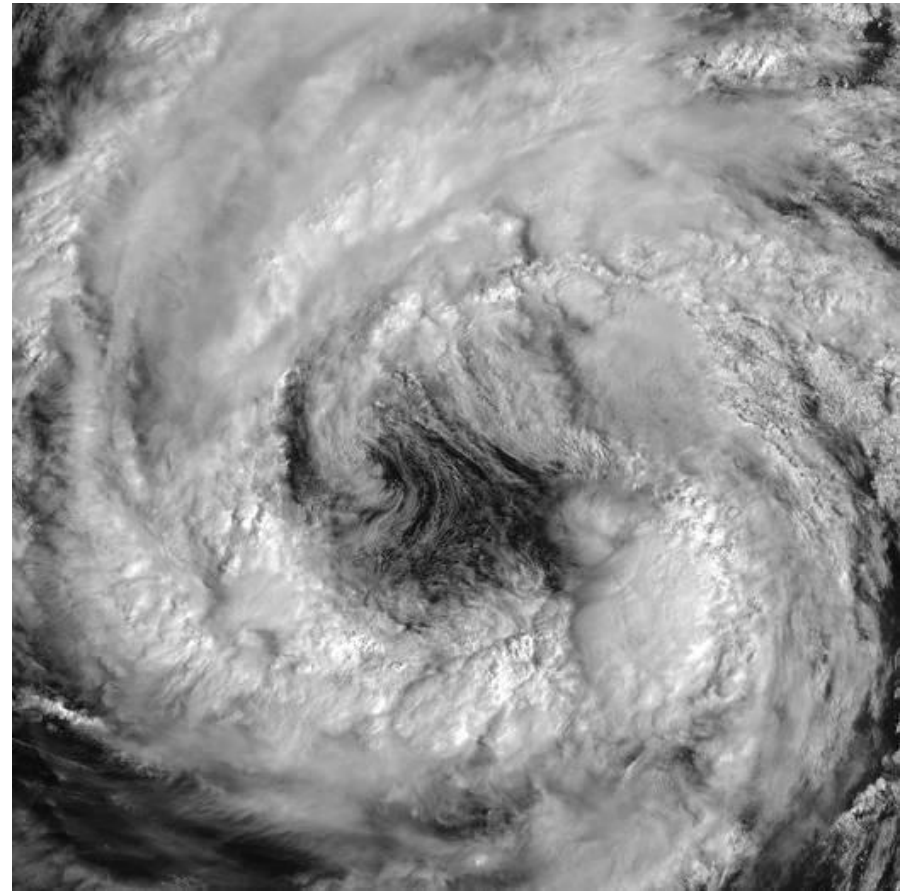
Rapid scan observation (MTSAT-1R)

2 Sep 2011 (STS Talas)

5 min interval



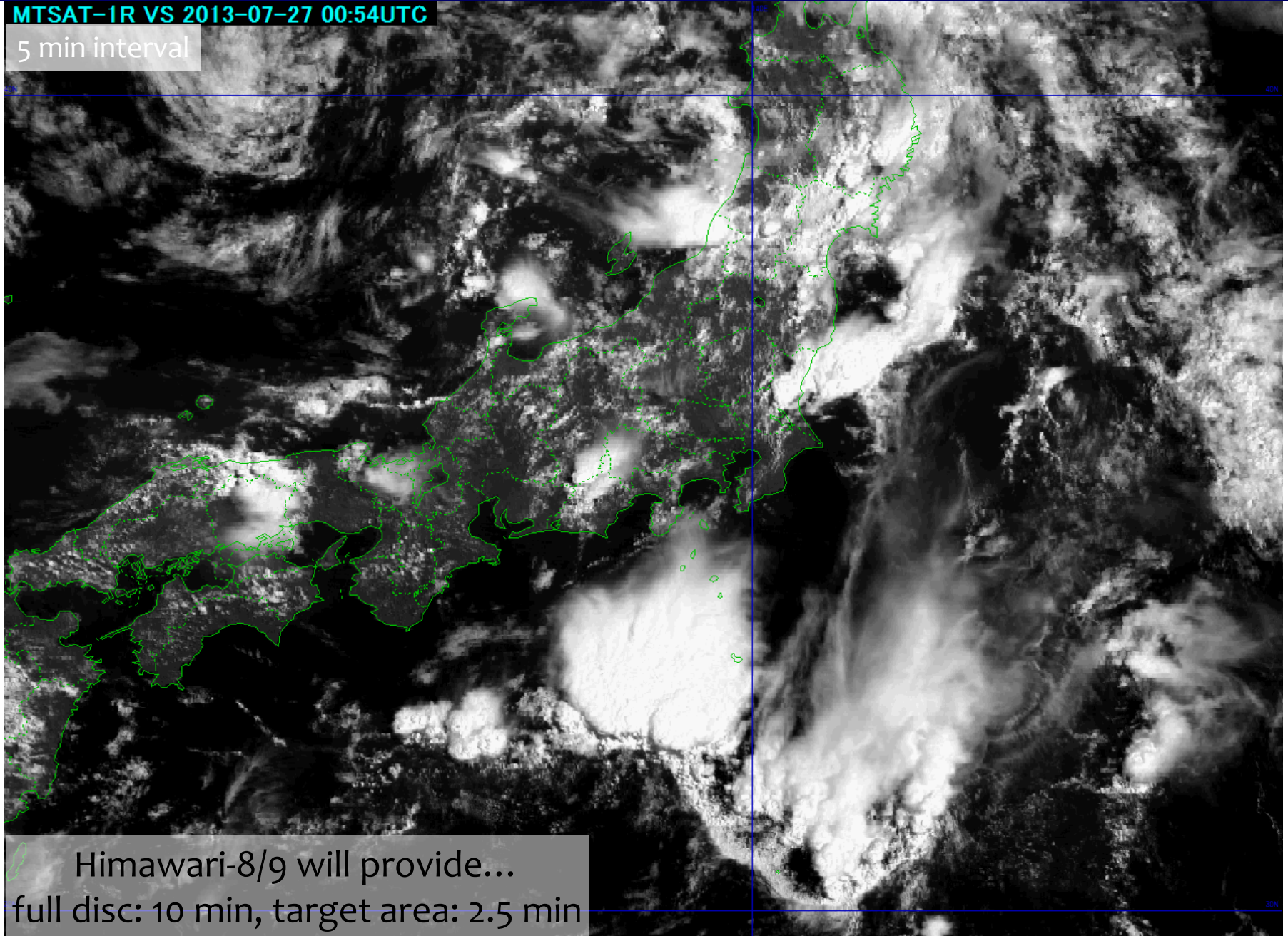
30 min interval



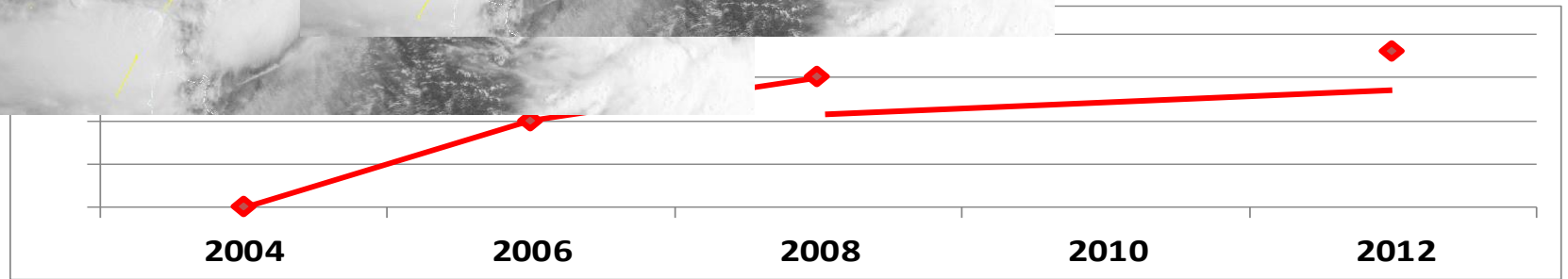
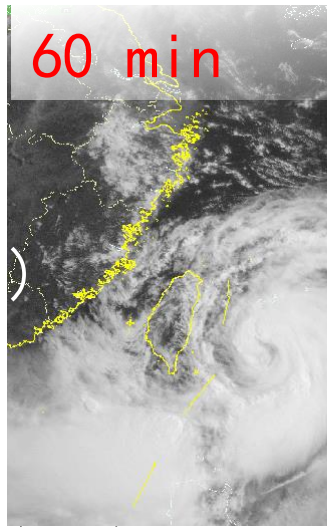
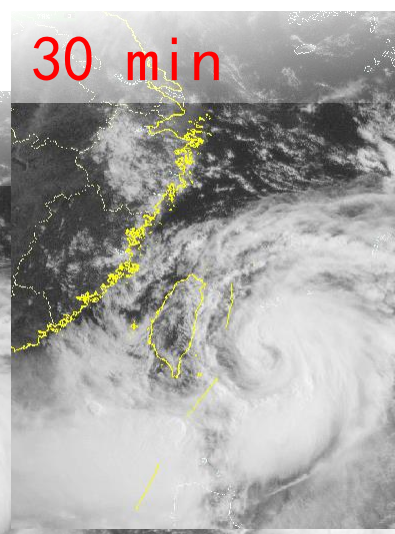
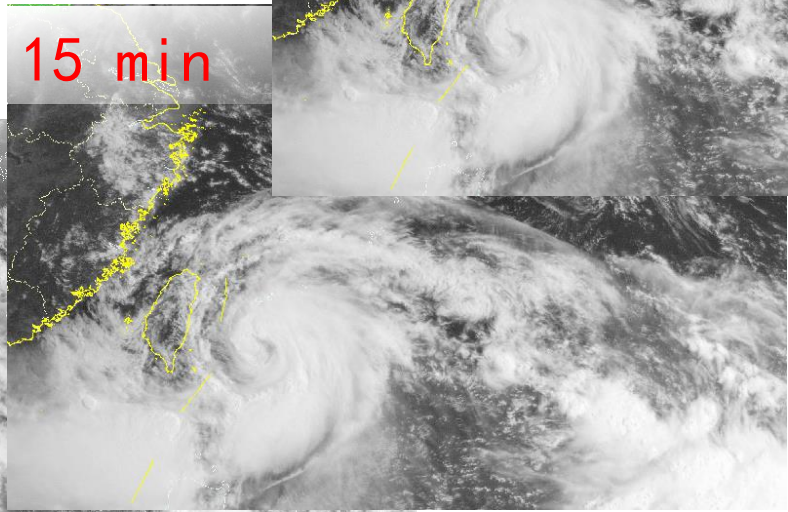
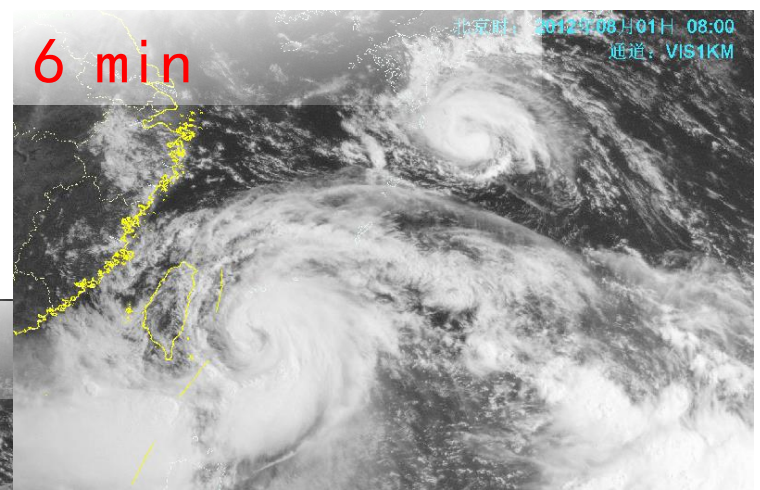
Rapid scan observation (MTSAT-1R)

MTSAT-1R VS 2013-07-27 00:54UTC

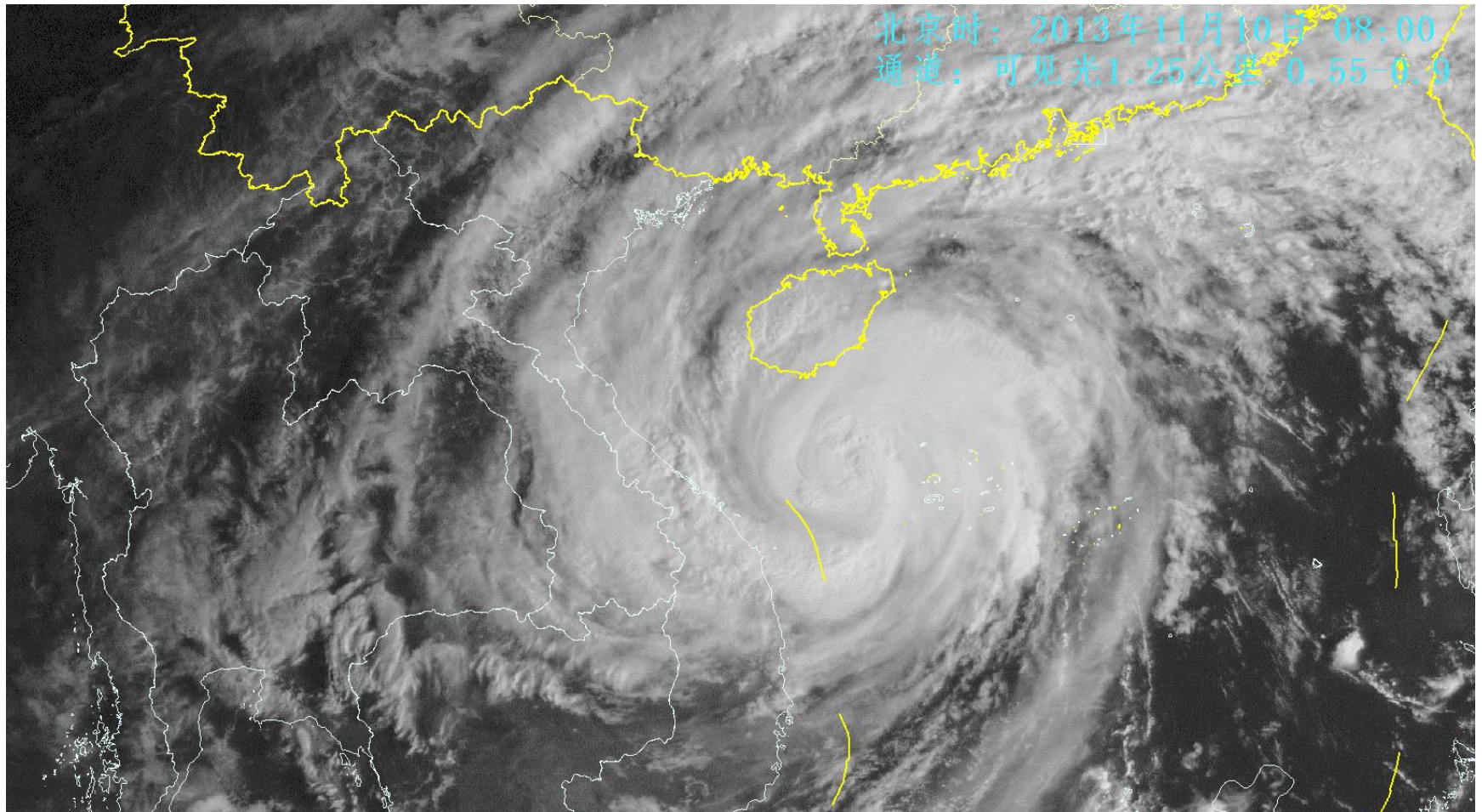
5 min interval



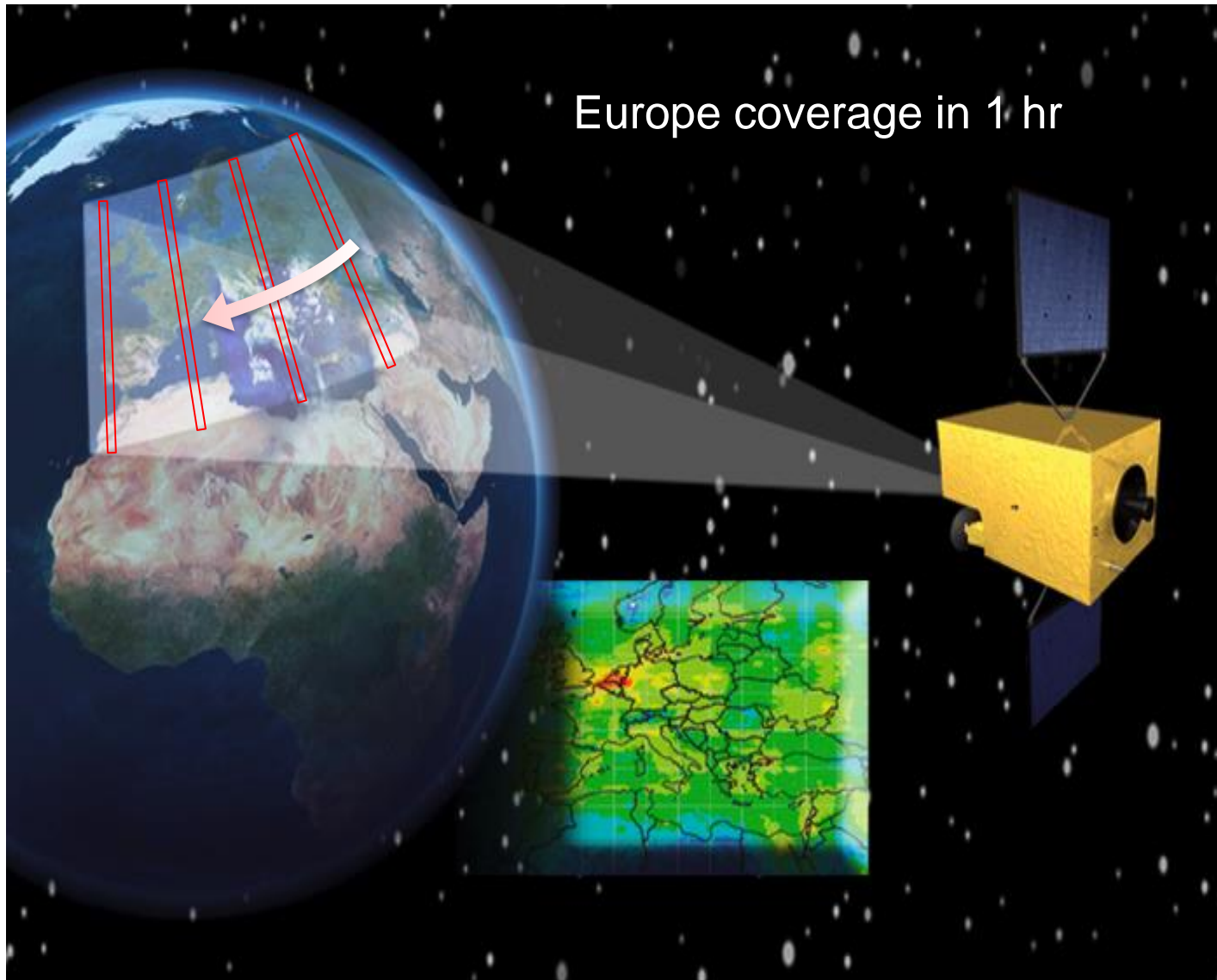
Himawari-8/9 will provide...
full disc: 10 min, target area: 2.5 min



Haiyan, Regional Rapid Scan, 12 mins



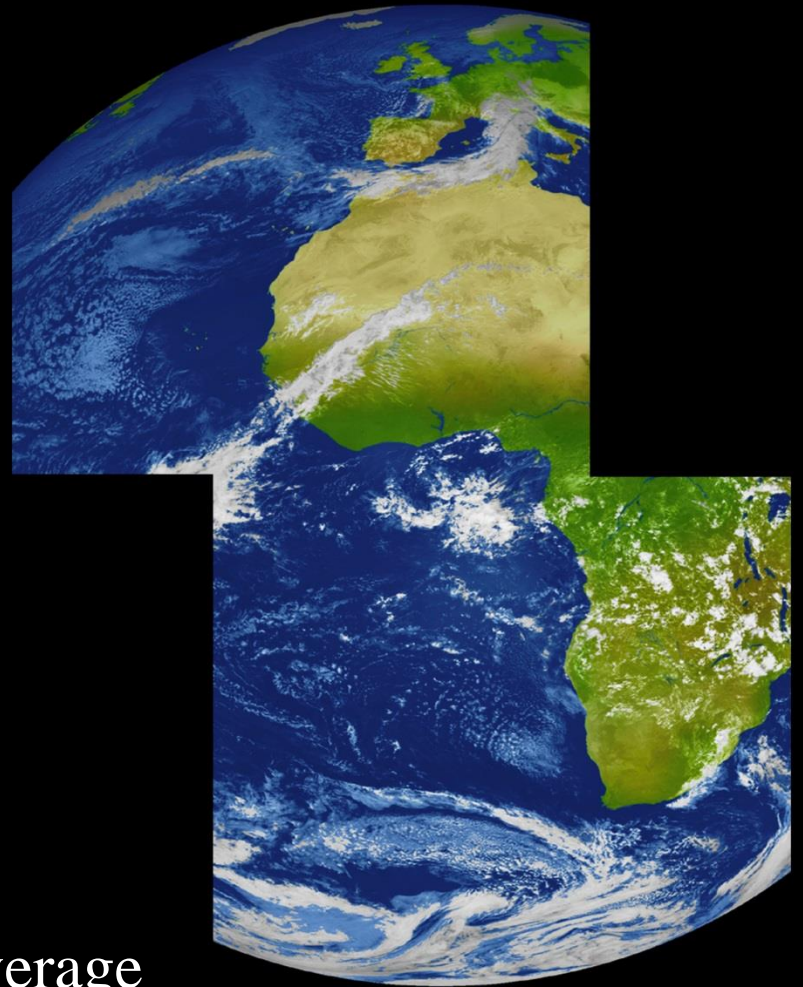
Sentinel-4: the GEOSTATIONARY atmospheric mission





MSG Coverage

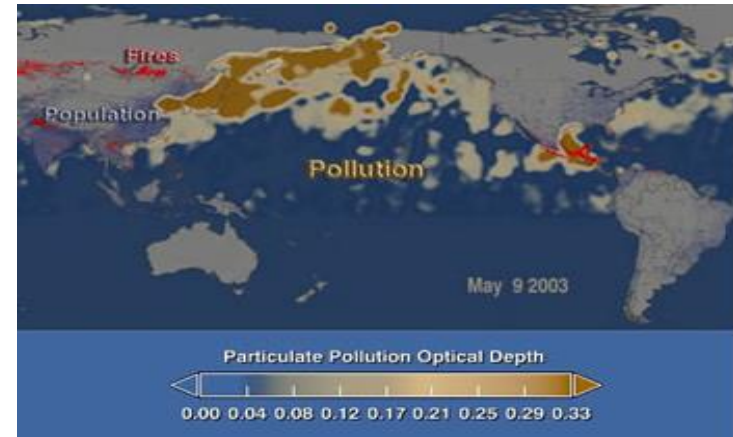
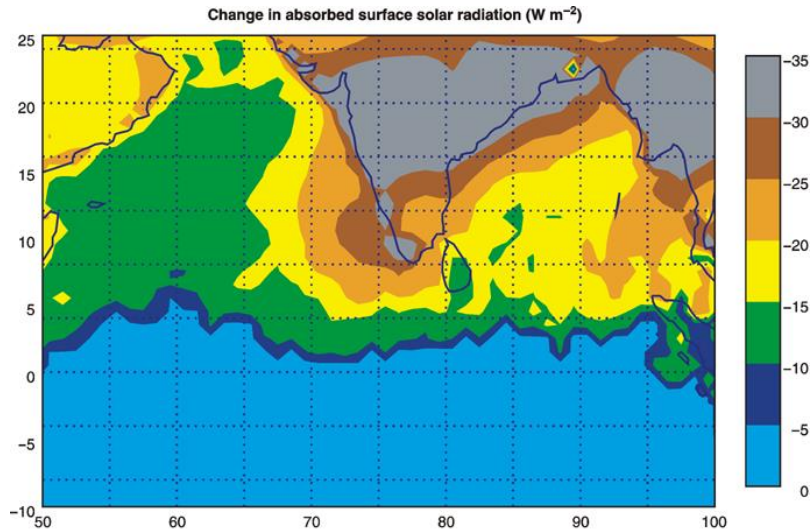
For all channels except HRV



For HRV

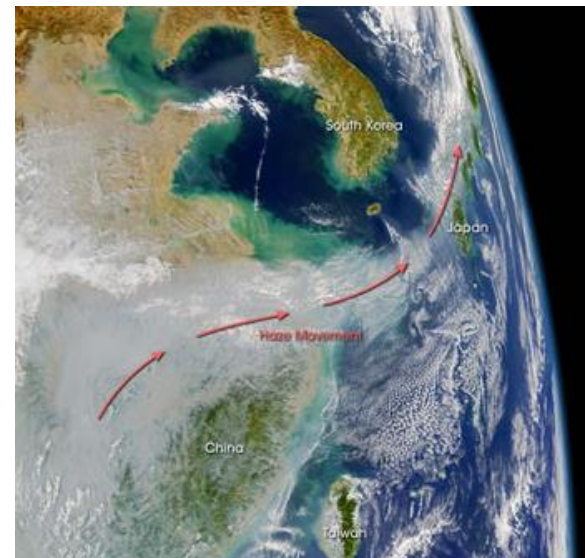
MSG MPEF products within 65° angle around subsatellite point

AEROSOLS AND ASIAN POLLUTION AFFECTING THE ENTIRE NORTHERN HEMISPHERE - IGAC



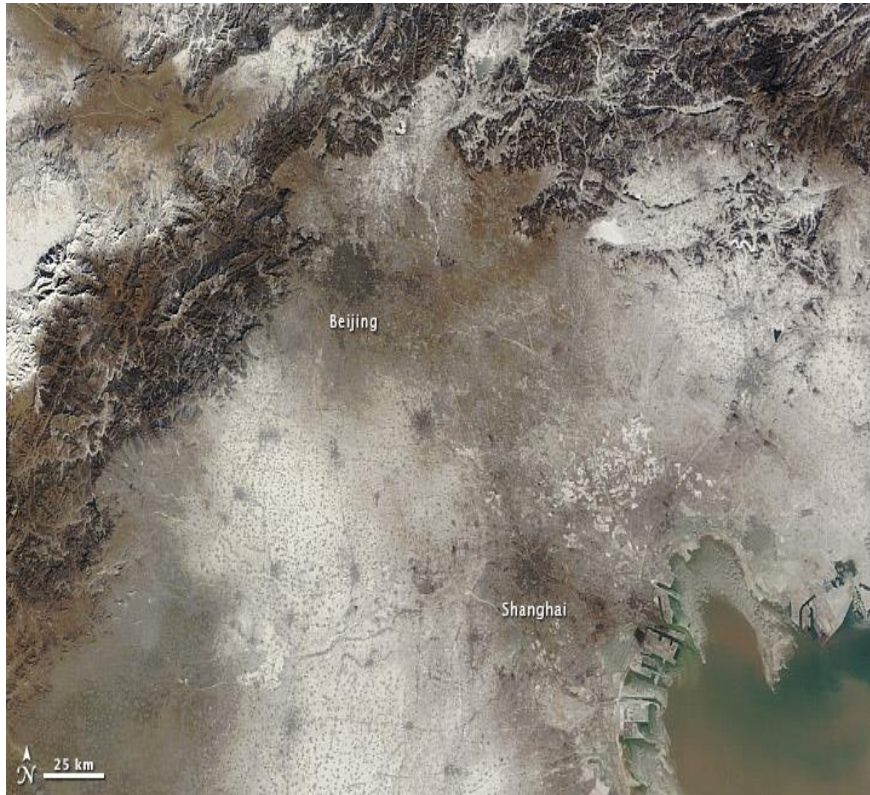
Optical depth of particles pollution. Much of this pollution is industrial but some is caused by fires. NASA image.

Reduction in surface solar radiation absorption due to the Indo-Asian haze effects (measured January to April from 1996-1999) (Ramanathan et al. 2001a) Steffen et al., 2004

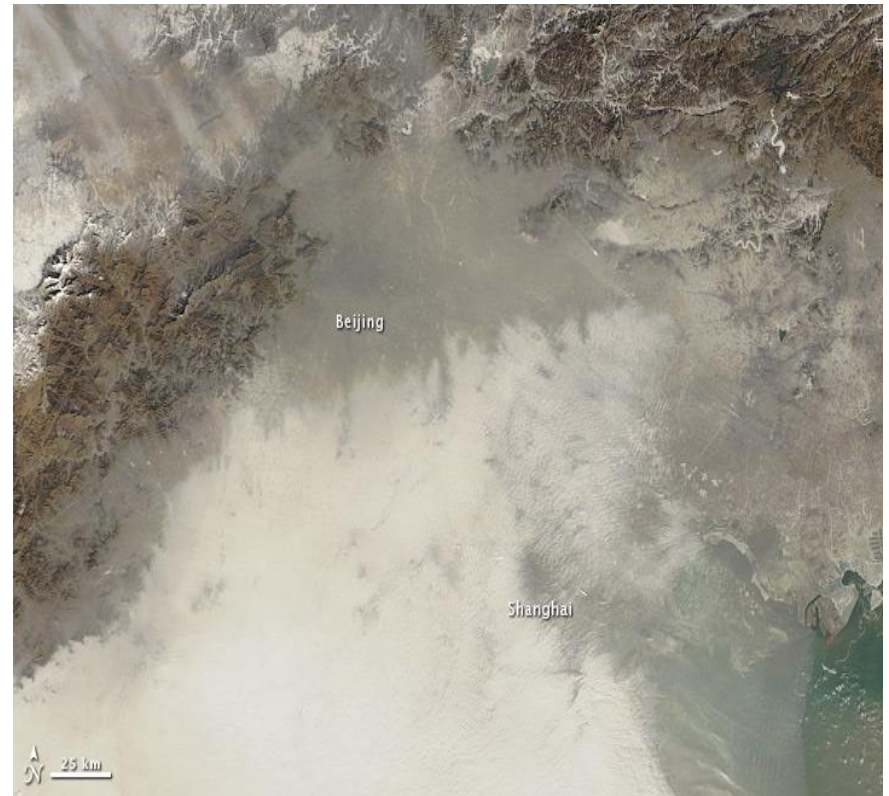


Local weather & climate has strong impact to transport & health (Beijing)

Sat image of Jan 3, 2013



Sat image of Jan 14, 2013

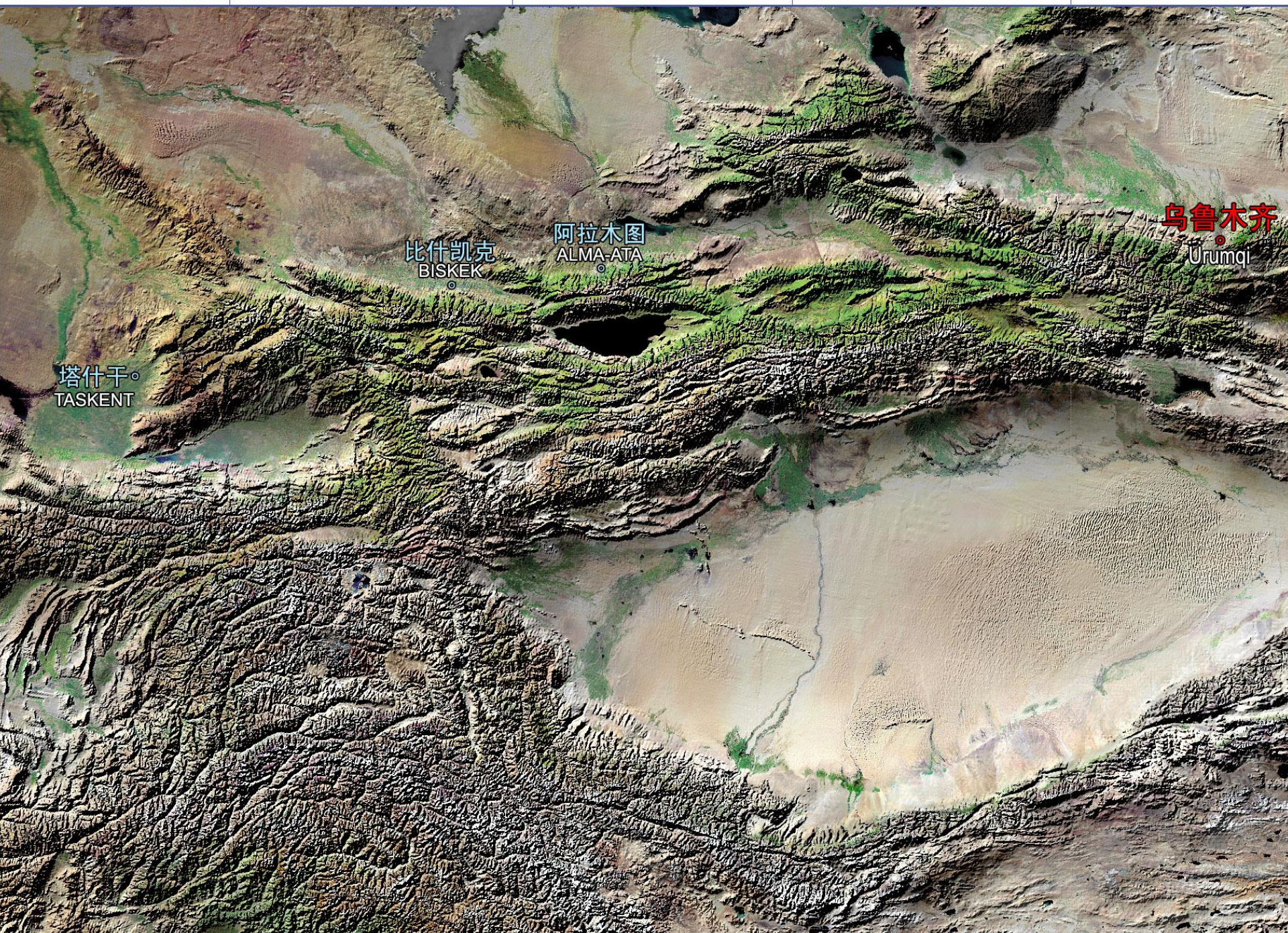


70°E

75°E

80°E

85°E



比什凯克
BISKEK

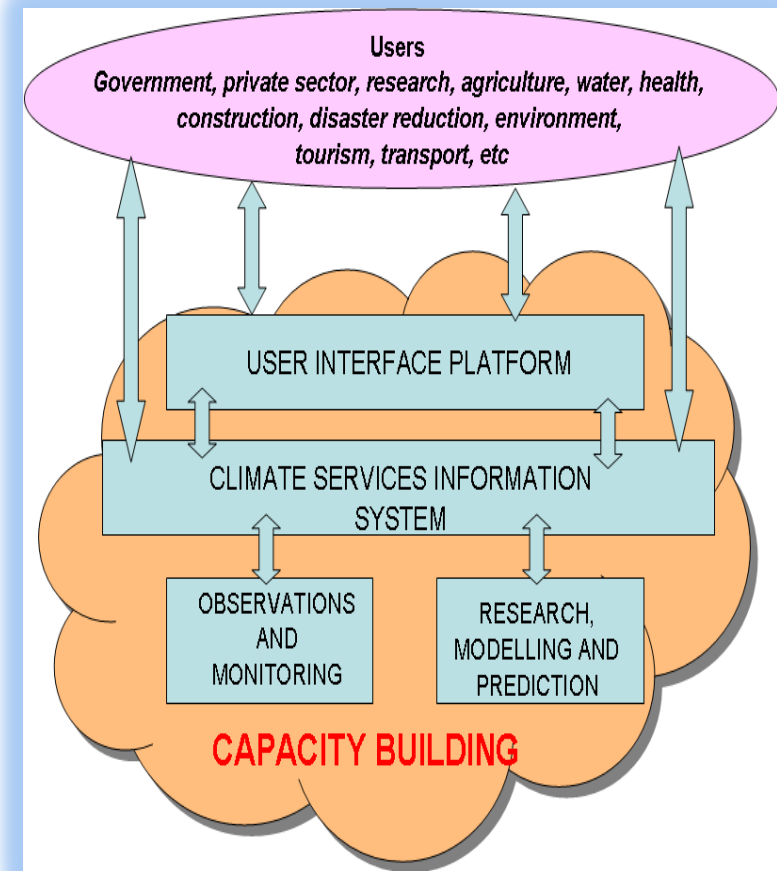
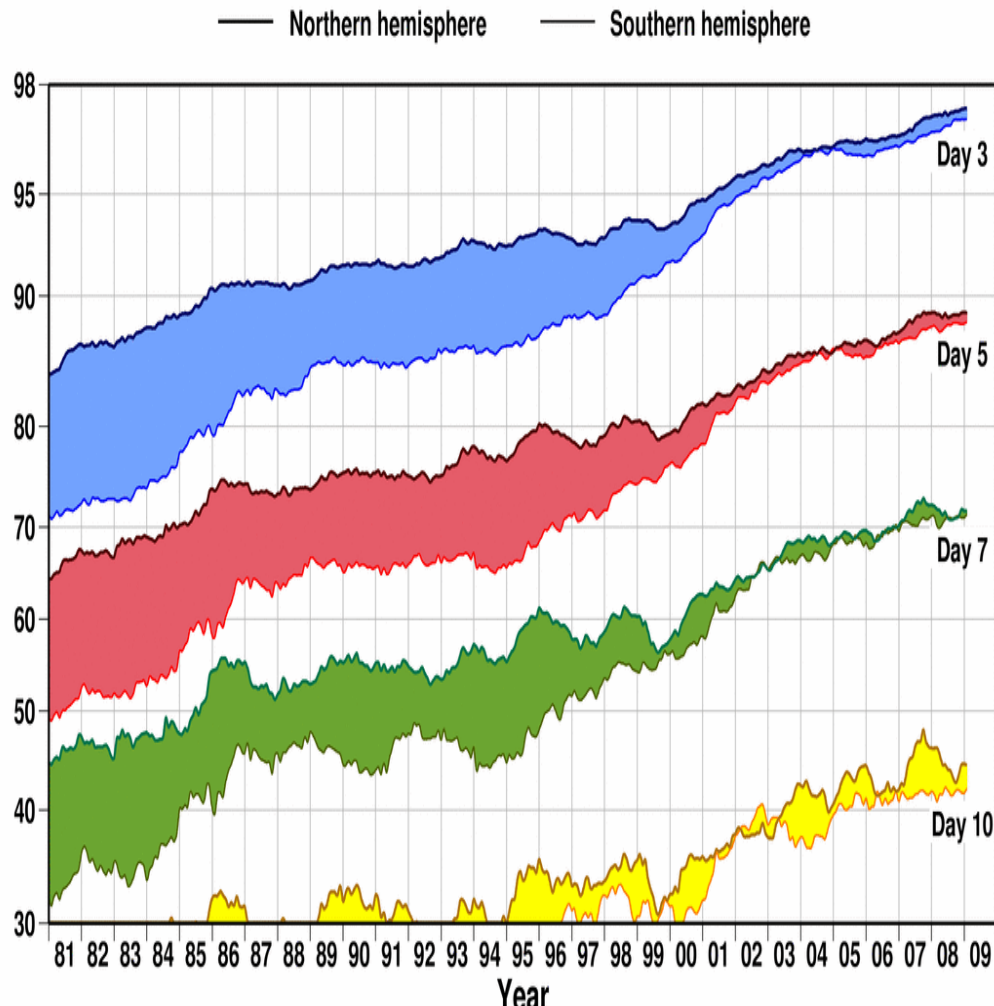
阿拉木图
ALMA-ATA

乌鲁木齐
Urumqi

塔什干
TASKENT

Summary: 50 years of WWW - Gold Brand. In next 50 years WMO will continue demo its value of international collaboration on Weather & Climate, and tailored services (transportation, energy, health, water, food, etc)

Anomaly correlation (%) of 500hPa height forecasts



Source: Martin Miller, ECMWF

Thanks for your attention

Q/A ?

Backup slides

WIGOS Information Resource

	WIGOS PO	OSD	SAT	ITS	DRMM	DMA

Walter views

- Meteorological observations
 - Station siting
 - Observation requirements and methods
 - Instruments standards
 - QA/QC requirements
 - Metadata requirements
- Best practices specifications
 - Surface energy balance
 - Inter-station interpolation