



CSA Report on Earth Observation

**Presented at
CEOS WGCV 28th Plenary
Sanya, China
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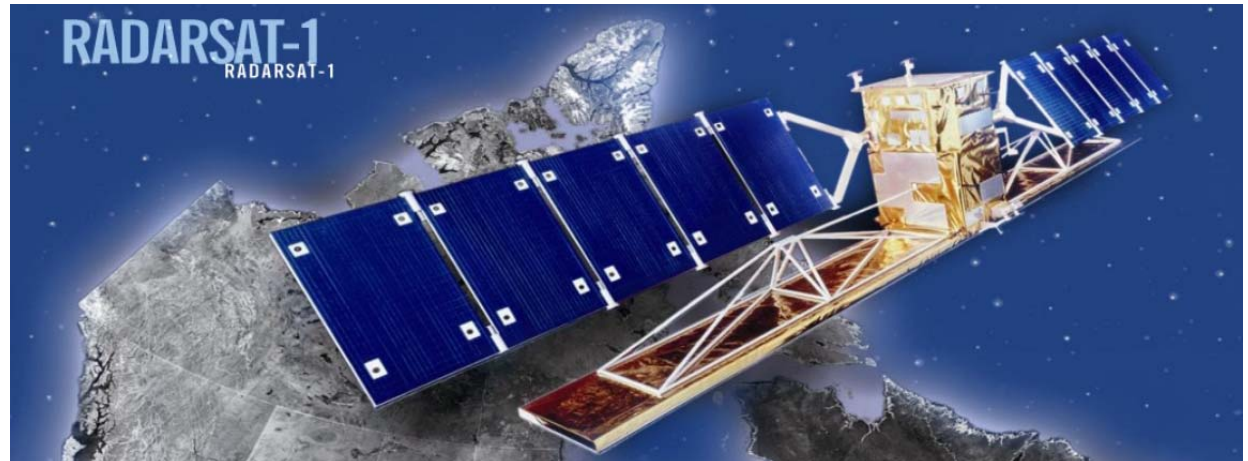


Agence spatiale
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Canadian Space
Agency

RADARSAT-1 Program Status (1)

- Nearing completion of 12 years of operation, funding in place to continue operation until March 2009
- Data received and processed at 38 ground stations with 25 archive facilities globally
- As of Jan. 1, 2008, completed 63,461 orbits, planned 293,183 user requests corresponding to a total acquisition of 571,100 minutes of SAR data
- Average system performance maintained better than 95%



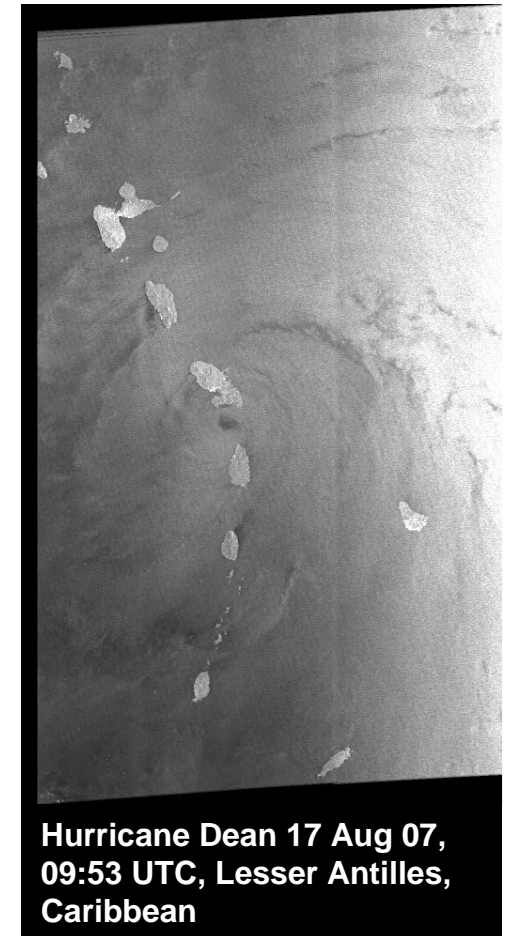
RADARSAT-1 Program Status (2)

- As a member of International Charter Space and Major Disasters, provided RADARSAT-1 data for **121** Charter emergencies to date
- Image quality and calibration maintained better than system specification
- Plans for Background Mission: Multiple coverage campaigns (using RADARSAT-1 and -2);
 - Multi-polarization coverage of continents;
 - Focus on Canadian site-specific data acquisitions for:
 - agriculture
 - environment
 - forestry
 - natural hazards, etc.
 - Seasonal coverage of Arctic Basin in support of IPY.

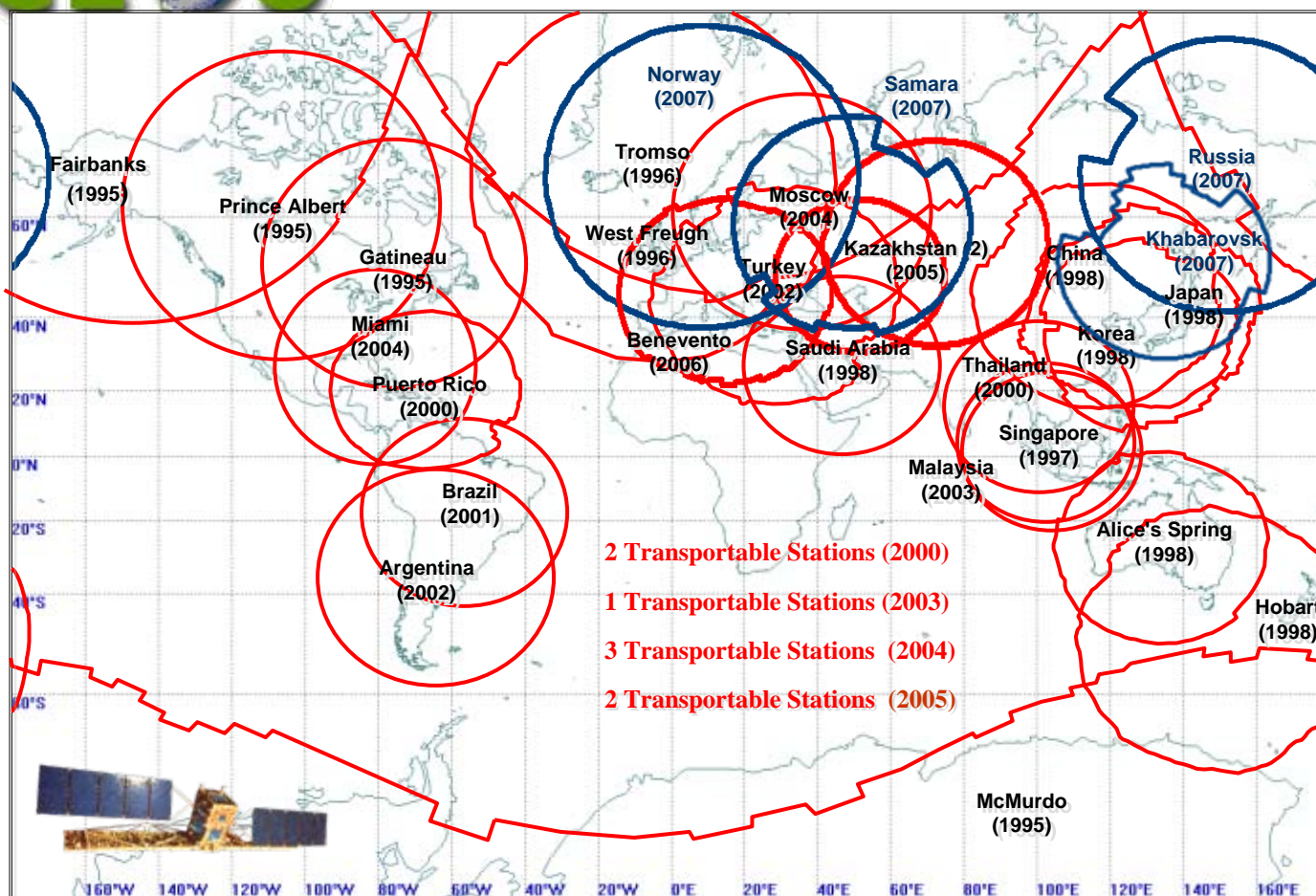
RADARSAT-1 Program Status (3)

Special projects: Hurricane Watch

- Program started in 1999, operates from June 1st to November 30th
- Hurricane Watch monitors North Eastern Atlantic, North Eastern & North Western Pacific regions to acquire RADARSAT-1 data of tropical cyclones
- Unique archives: 589 Hurricane Watch images submitted, 221 images captured eye or edge of cyclones
- ***Innovative research and development of applications using RADARSAT-1 Hurricane SAR data:*** CSA Announcement of Opportunity (AO) soon coming to give access to 160 images from archives to the scientific community



RADARSAT-1 Reception Coverage



2007

2006

2005

2004

2003

2002

2001

2000

1999

1998

1997

1996

1995

➤ **Data Reception Facilities: 38 (including 8 transportable stations)**

➤ **Data Archiving Facilities: 25**

➤ **Under certification: 1**

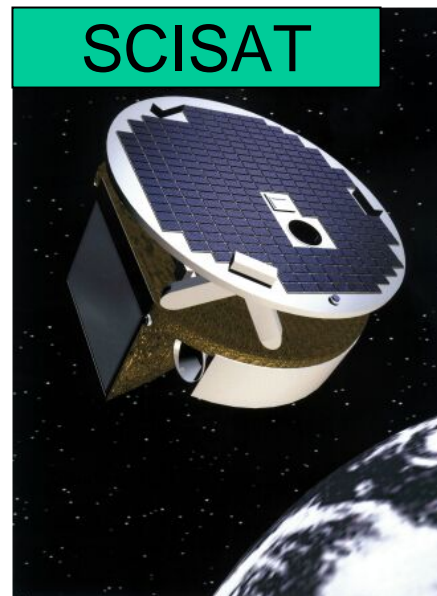


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SCISAT Program Status (1)

- Launched in August 2003, SCISAT satellite measures numerous trace gases, thin clouds and aerosols in the stratosphere, thereby enabling a more comprehensive understanding of the several chemical processes that play a role in stratospheric ozone depletion

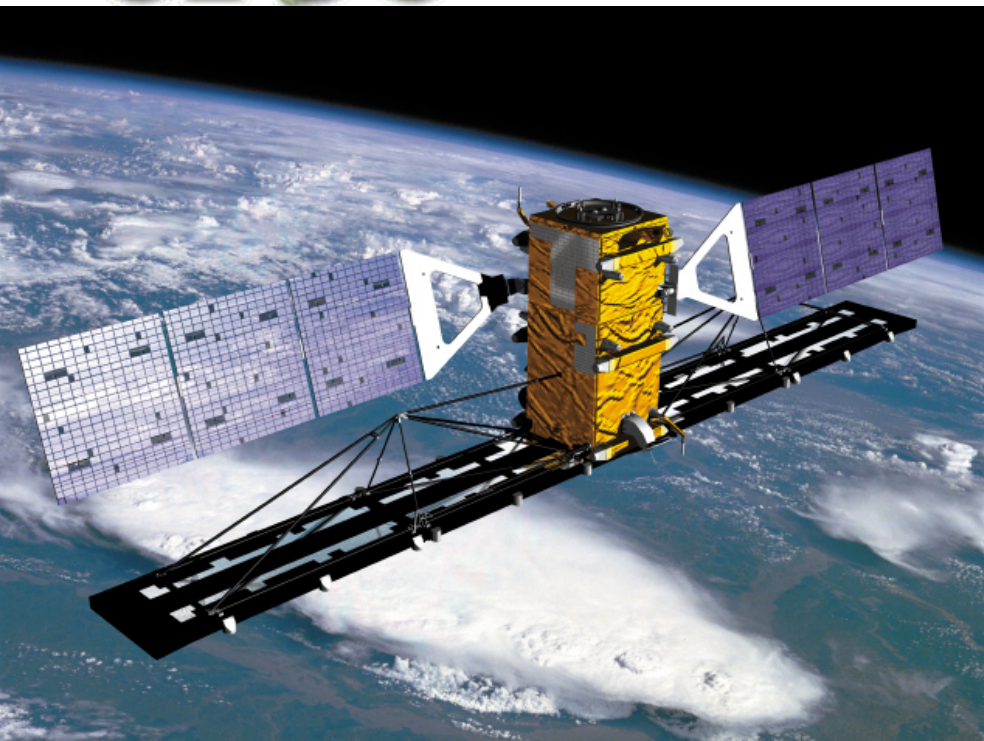




SCISAT Program Status (2)

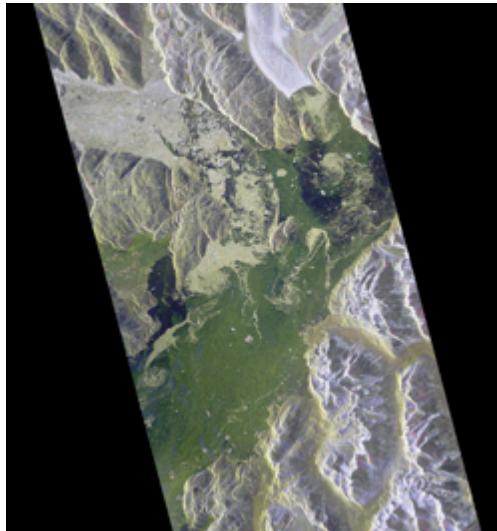
- Capacity to receive science data was augmented from 1.1 GB (gigabytes) to 2.9 GB per day by employing two Canadian stations and those of US and European partners
- In present fiscal year alone (Apr. 1, 2007 – Jan. 31, 2008) amounts of science data collected were: FTS: 556.8 GB, Imager: 82.5 GB, MAESTRO: 21.6 GB
- Data routinely being provided to the science team. Intensive data analyses by scientists have produced a number of new results that have been disseminated at international scientific conferences and through the publication of peer-reviewed scientific papers



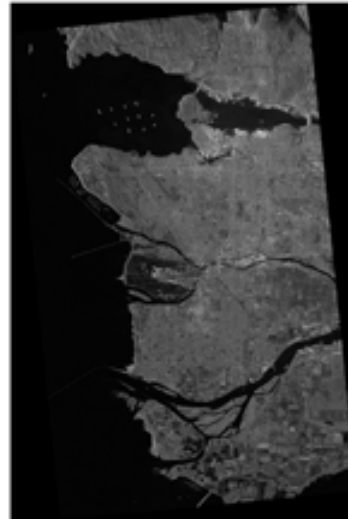


- Most advanced commercial C-Band SAR satellite (MDA)
- Launch successfully on Dec. 14, 2007
- Undergoing through commissioning

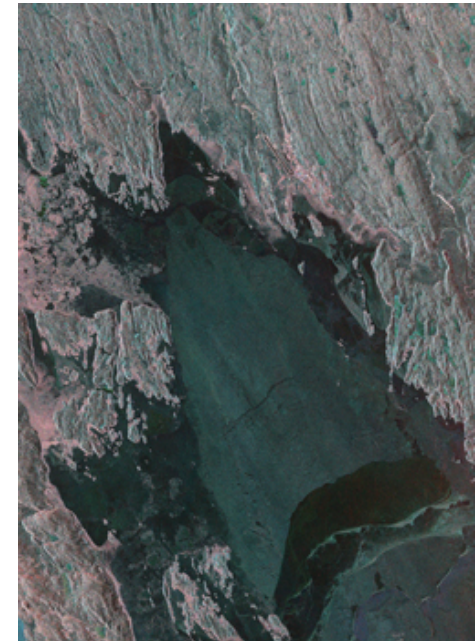
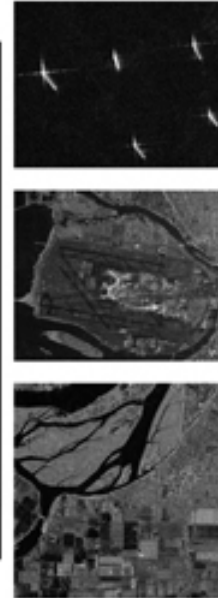
	Design Life	Imaging frequency	Spatial resolution	Polarization	Look direction	Status
RADARSAT-2	7 years	C-Band, 5.405 GHz	3 to 100 meters	Single (HH, VV, VH, HV) Dual (HH/ HV, VV/VH) Polarimetric	Right- and left-looking	Launch 2007
RADARSAT-1	5 years	C-Band, 5.3 GHz	10 to 100 m	Single HH	Right-looking	In operation (Since 95)



Greenland
Standard Quad-Pol
December 18, 2007



**Vancouver,
Canada**
Ultra-Fine
January 6, 2008



**Iqaluit, Nunavut,
Canada**
Fine Quad-Pol
January 7, 2008

RADARSAT-2 First Images (*Courtesy of MDA*)



RADARSAT Constellation: Advancing National Priorities

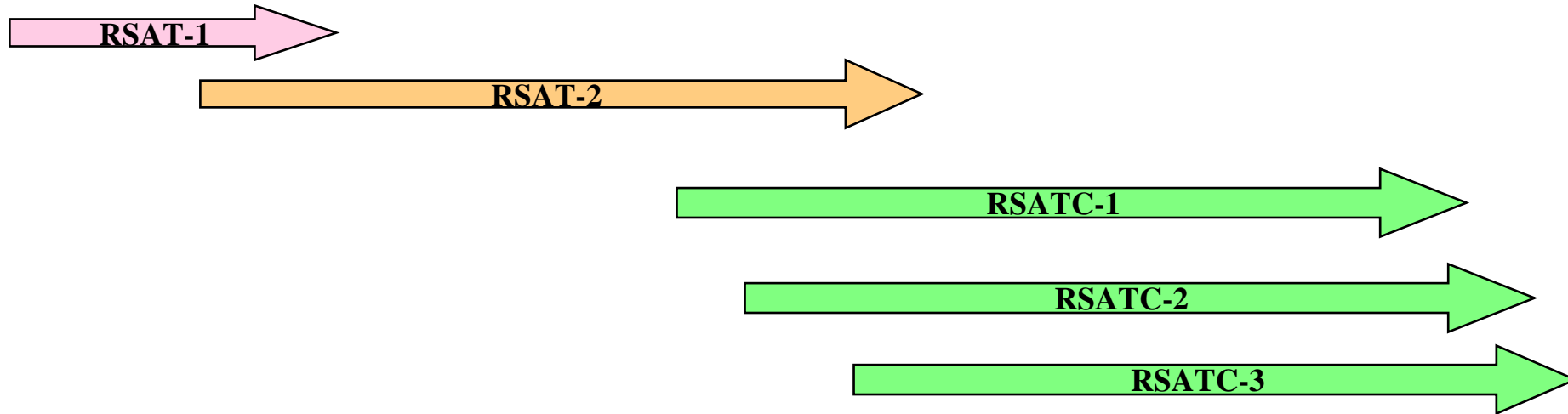
PROJECT OVERVIEW

The RADARSAT Constellation is the evolution of the RADARSAT Program. Over the next decade, the objective is to ensure C-band data continuity, enhance operational use, and improve system reliability.



RADARSAT Constellation Program Status

- Constellation of 3 satellites in same orbital plane, equally spaced 15 to 30 minutes apart for
 - Maritime Surveillance
 - Disaster Management
 - Coherent Change Detection
 - RADARSAT-2 continuity
- Phase A completed
- 5 year development, 1 satellite launched every year, starting 2012 time frame



2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	»
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Chinook Mission and SWIFT

- Development of an instrument called SWIFT (Stratospheric Wind Interferometer for Transport) to better understand the global atmospheric circulation
 - Provide means to validate complex climate and weather models
 - Preliminary design phase completed in 2006
- Chinook Mission – definition phase completed in 2005
- Budgetary constraints and CSA internal priority reviews have made it necessary to optimize the requirements and address some key technical risks
- CSA currently exploring alternative approaches for Chinook Mission implementation

7th Advanced SAR Workshop of CSA

- The 7th Workshop was hosted jointly by CSA and CEOS WGCV SAR Subgroup
- Held on September 11 - 13, 2007 in Vancouver, Canada
- 134 Participants from 13 different countries
- 98 Papers presented in all areas of SAR technologies and advanced applications, Workshop Proceedings just produced and being distributed on CD to attendees
- Advanced SAR workshop is one of the few major SAR events and it confirms the leadership of Canada in this niche technology
- For workshop details visit
www.space.gc.ca/asc/eng/events/2007/asar.asp

Project DELTA Update

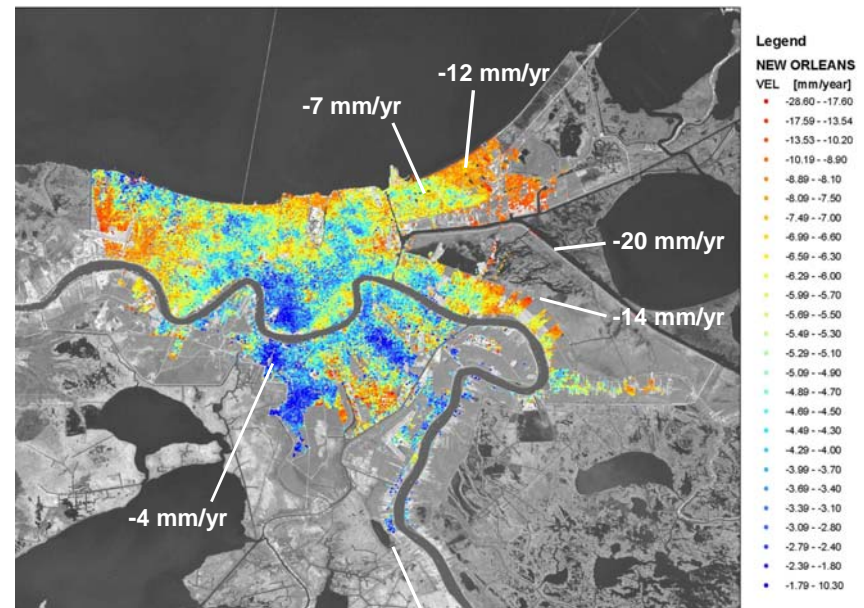
(Differential Elevations, Levees and Terrain Assessment)

A Collaborative Effort Between CSA, USGS and NASA

INNOVATIVE RESEARCH AND DEVELOPMENT INTO THE APPLICATION OF RADARSAT-1 INTERFEROMETRIC DATA FOR SUBSIDENCE MAPPING IN NEW ORLEANS

- 23 Proposals accepted from PIs in 11 countries
- First progress report from PIs on their investigations received in September 2007
- RS-1 data acquisitions completed in January 2008
- Final reports due end of April 2008
- User workshop TBD

Local variations of subsidence (w.r.t. Earth's Center)

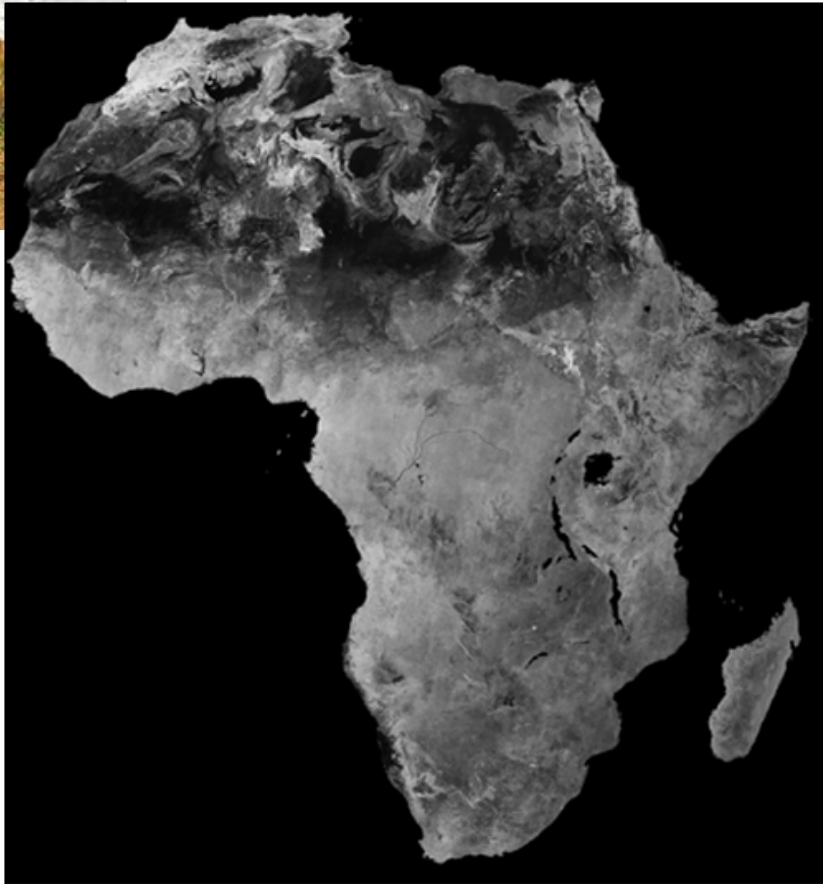


average subsidence with respect to Earth's center:
4-9 mm/yr in LOS direction --> 5-10 mm/yr in vertical direction

Note: ~2 mm/yr
sea-level rise !



TIGER INITIATIVE



Canada's contribution
to water management
in Africa



TIGER - Canadian Supported Project

North Africa and Nile Basin

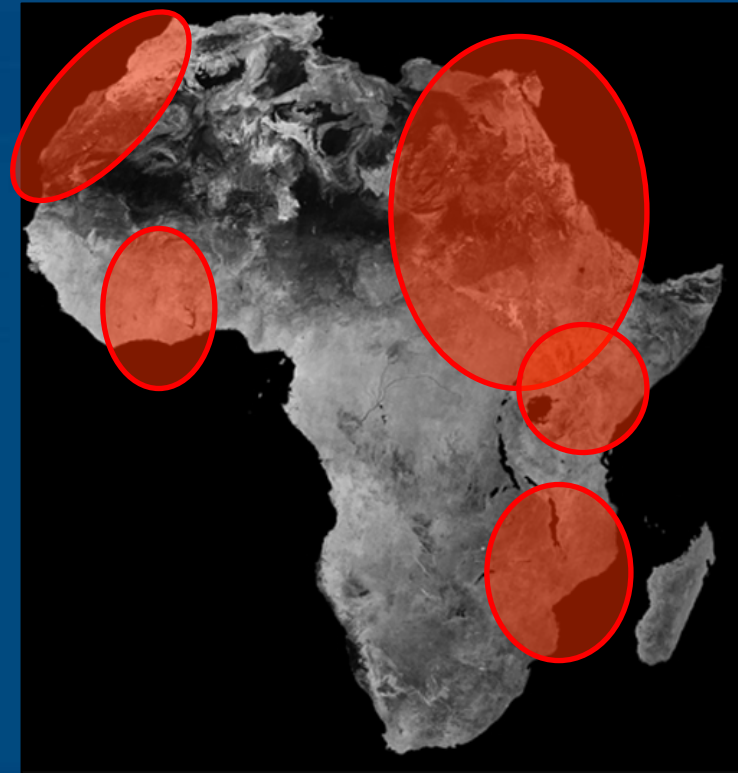
- *Nile Rive Awareness Kit (RAK) - Hatfield*
- *Integrated Aid System for IWRM - IUCN*

South and East Africa

- *River Basin Management – I.E.S.*
- *Mosquito and Malaria - Noetix*

Western Inter-Tropical region of Africa

- *Satellite Hydrogeology - Golder*
- *ARBRE – Vexcel (Microsoft)*
- *StereoSat Africa - Viasat*



7 supported projects
\$ 3.4 M / 3 yr

- Canada, an active member of GEO
 - Playing a leadership role with South Africa as co-chair of the Task Force for the Report on Progress
 - EOS-IV represents a significant opportunity for Canada to influence international Earth Observation (EO) investments in Canadian priority areas such as the North
 - EO is a core business of CSA and it is working with other govt. departments in underpinning policy decisions in areas of security, sovereignty and environment
- Interdepartmental Canadian GEO Secretariat established in 2005
 - Functions
 1. Administer Canada's engagement in International GEO (30%)
 - correspondence, official comments, delegation support, etc
 2. Coordinate the development of a Canadian Strategy for Earth Observation (70%)
 - advance the principles of GEO/GEOSS within Canada, e.g.,
 - coordinated EO data collection
 - data policies and infrastructure to support improved data access and interoperability
 - transformation of EO data into information for decision support
 - engagement of end users to realize societal benefits