

## → FRINGE 2015 WORKSHOP

Advances in the Science and Applications of SAR Interferometry  
and Sentinel-1 InSAR Workshop

# ESA Heritage SAR missions: *ERS and Envisat*

ERS/Envisat teams

23–27 March 2015 | ESA–ESRIN | Frascati (Rome), Italy

For the last 25 years, ESA has been constantly supporting the SAR Interferometry (InSAR) communities with:

- ❑ the **provision of InSAR data**, through:
  - ✓ the development and operations of SAR satellites (ERS-1, ERS-2, Envisat)
  - ✓ a precise satellite orbital maintenance including InSAR tandem campaigns (ERS-1/ERS-2 tandem, ERS-2/Envisat tandem)
  - ✓ the development of a large and consistent InSAR data archive
  - ✓ a constant effort in facilitating the use of SAR data
- ❑ the **development of InSAR science and InSAR applications**,
- ❑ bringing together the InSAR communities through the **Fringe workshop**.



# ERS missions: the birth of InSAR



# nature

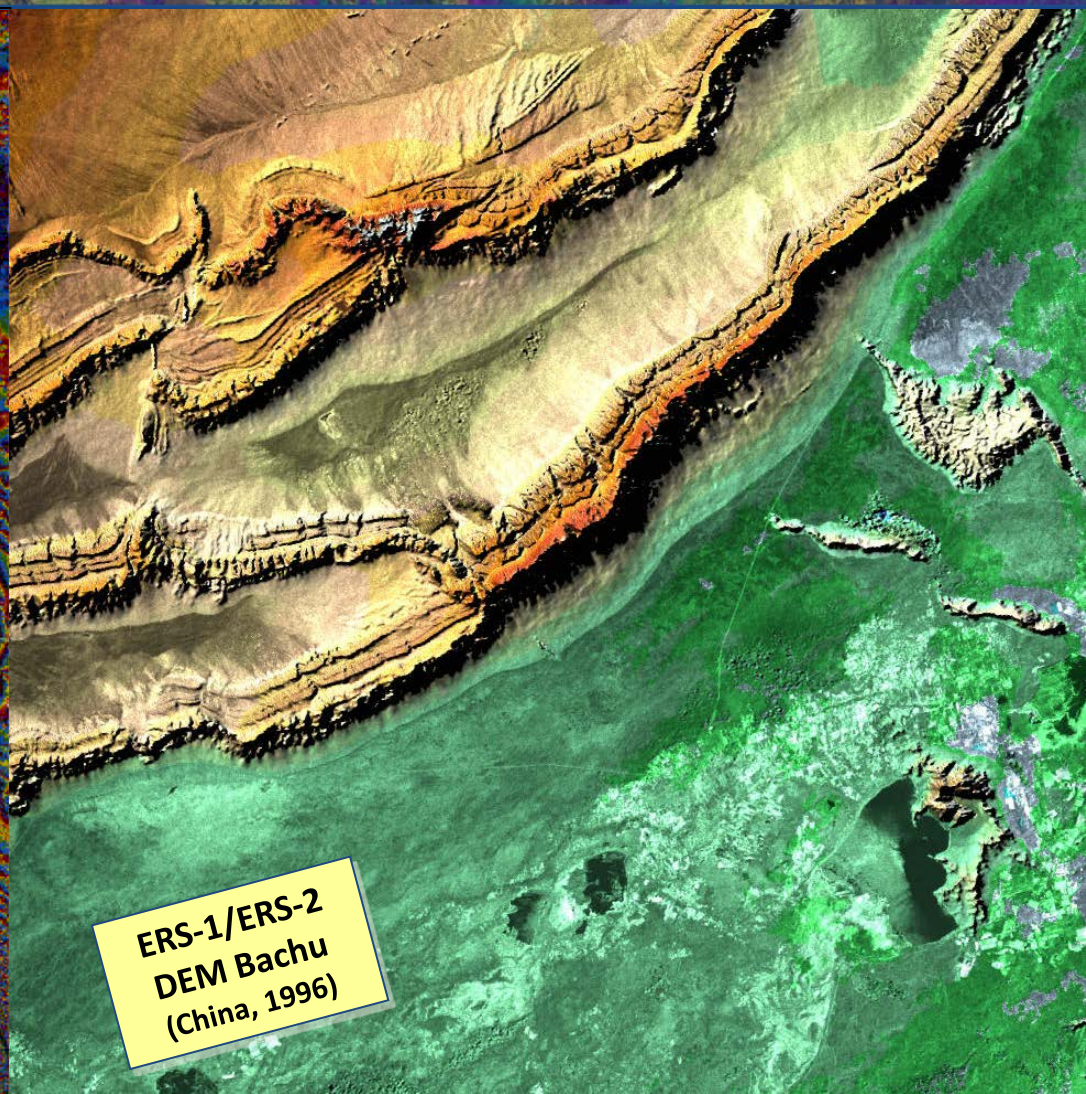
INTERNATIONAL WEEKLY JOURNAL OF SCIENCE

Volume 364 No. 6423 8 July 1992 £3.00

## Image of an earthquake

ERS-1  
Landers earthquake  
(California, 1992)

...scription factors  
... for biodiversity  
... ological detection of a  
... mantle plume?



ERS-1/ERS-2  
DEM Bachu  
(China, 1996)

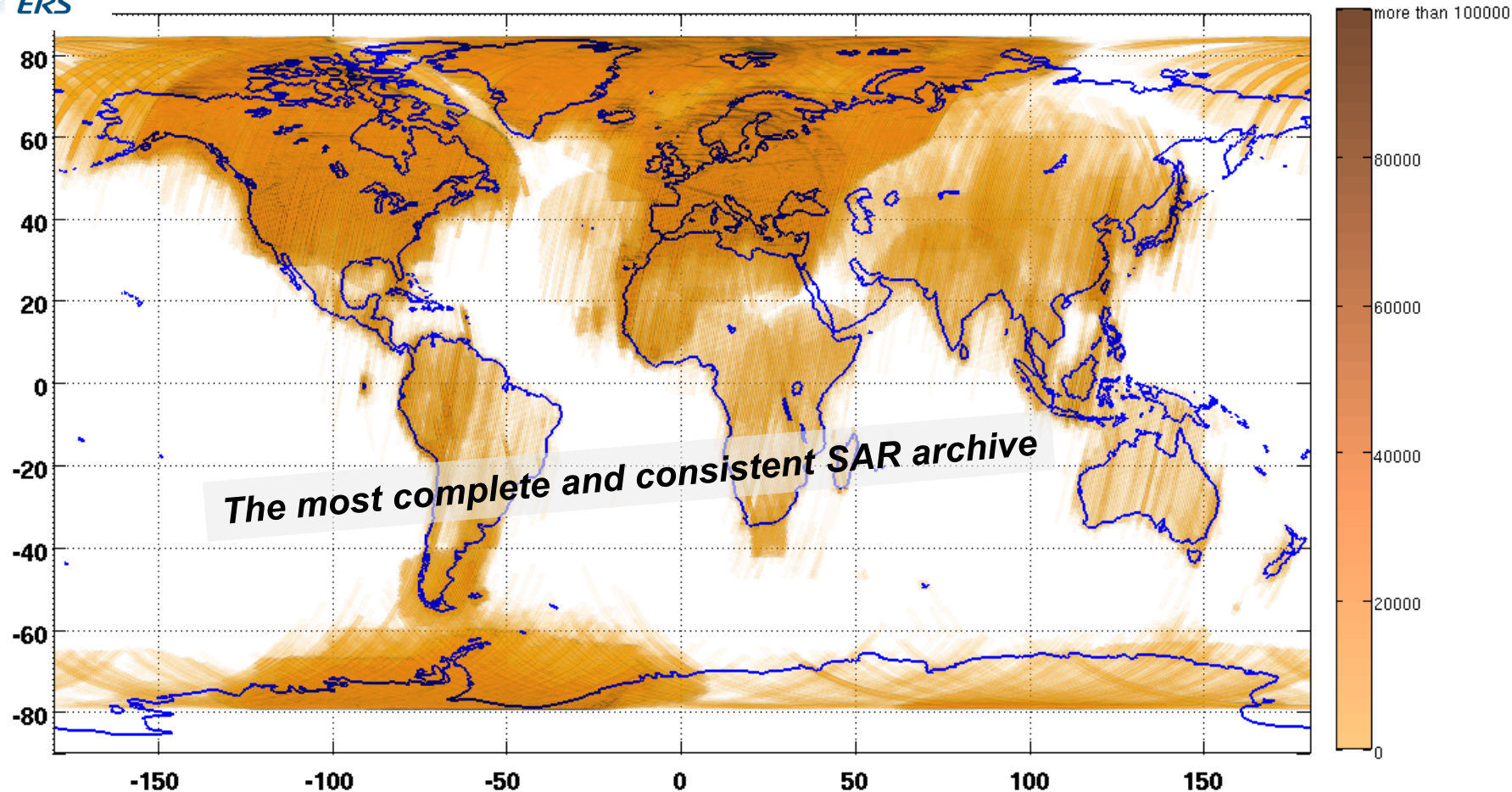


# ERS missions: a 20-years InSAR archive



[1991-2011]

ERS SAR Polarization: VV until mid 2009





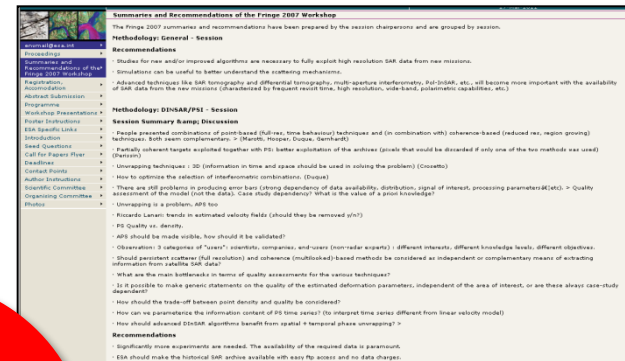
# The user feedback on mission operations



*The user communities have strongly influenced the operations scheme of the ERS and Envisat missions*

## Workshop recommendations

### User Workshops



### ESA actions

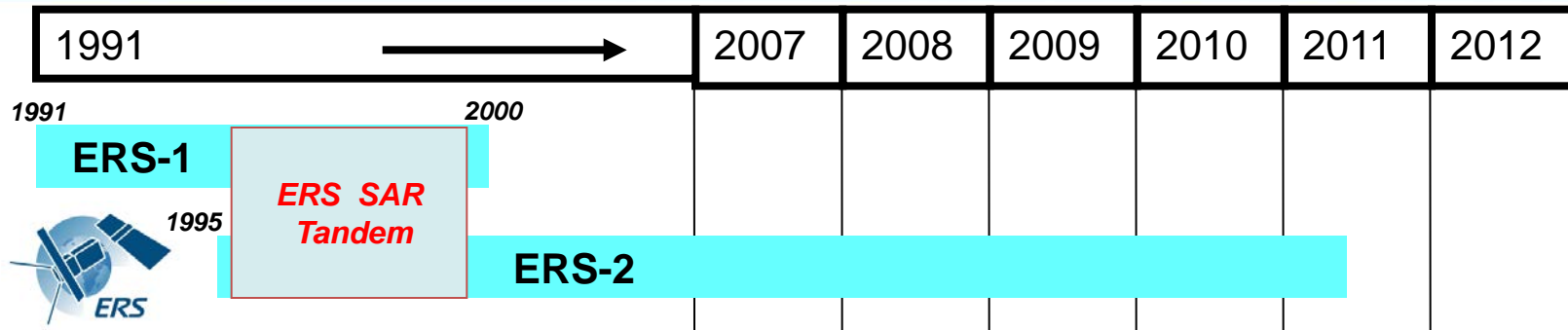
**Modification of  
Mission operations setup**

**Upgrade Algo & Toolbox**

**Support to exploitation**

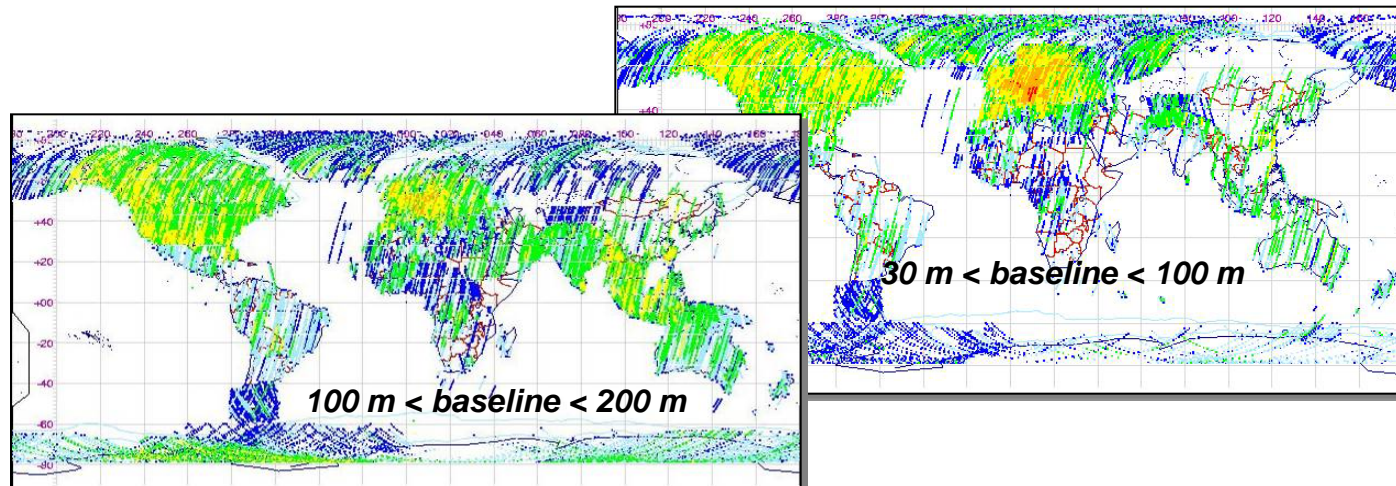
**User Training**

# The tandem missions → 1-day interval



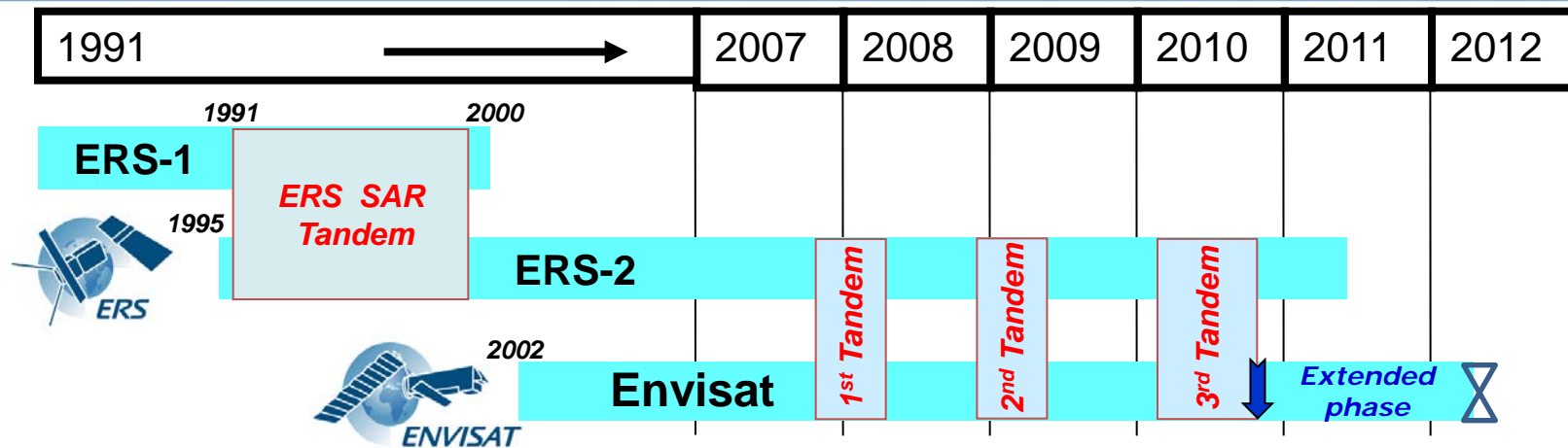
→ The *ERS-1 / ERS-2 SAR tandem campaign* (1-day time interval)

**ERS SAR**  
**1-day tandem:**  
**a unique dataset !**



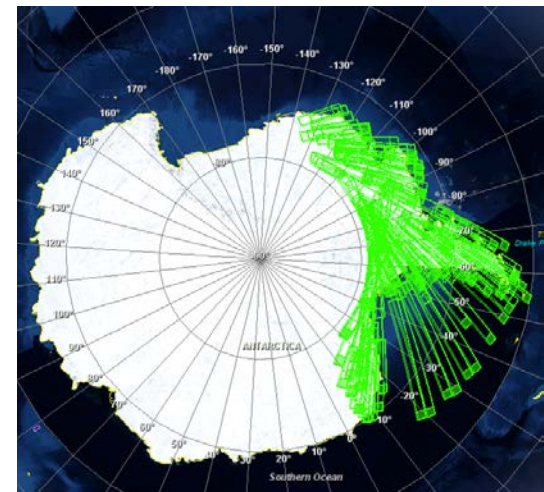
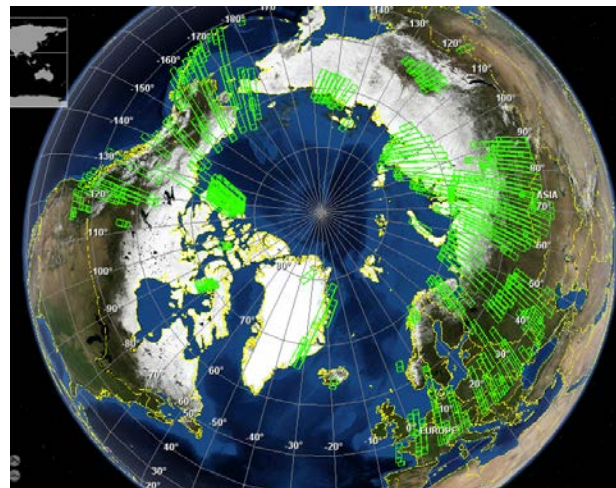


# The tandem missions → 30-min interval

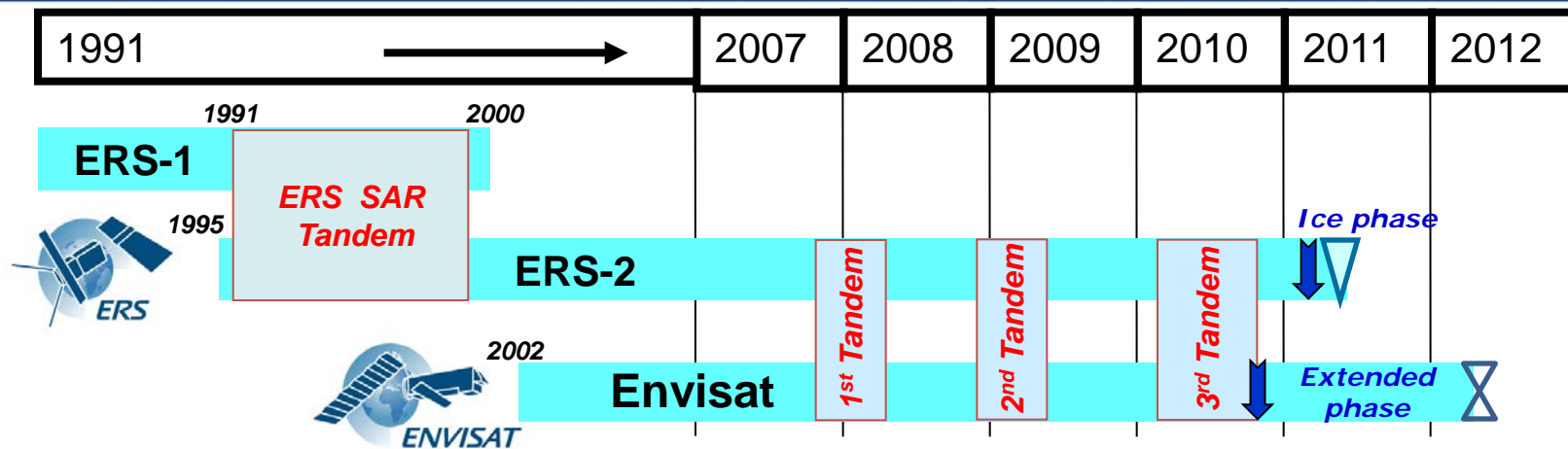


→ Three *ERS-2 / Envisat SAR tandem campaigns* (30 min. time interval)

**ERS/Envisat  
30-min tandem:  
another unique dataset !**

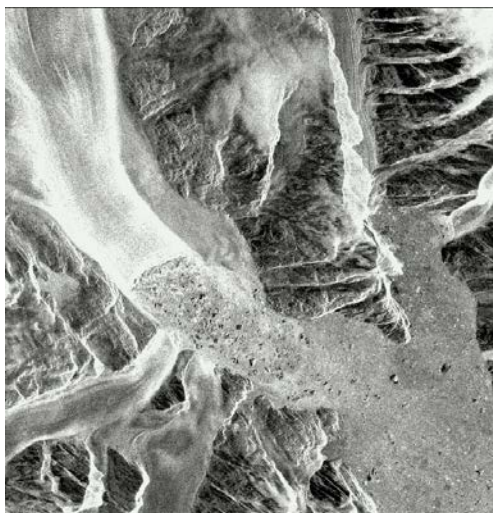


# An end of mission answering to polar needs → the ERS-2 ice phase



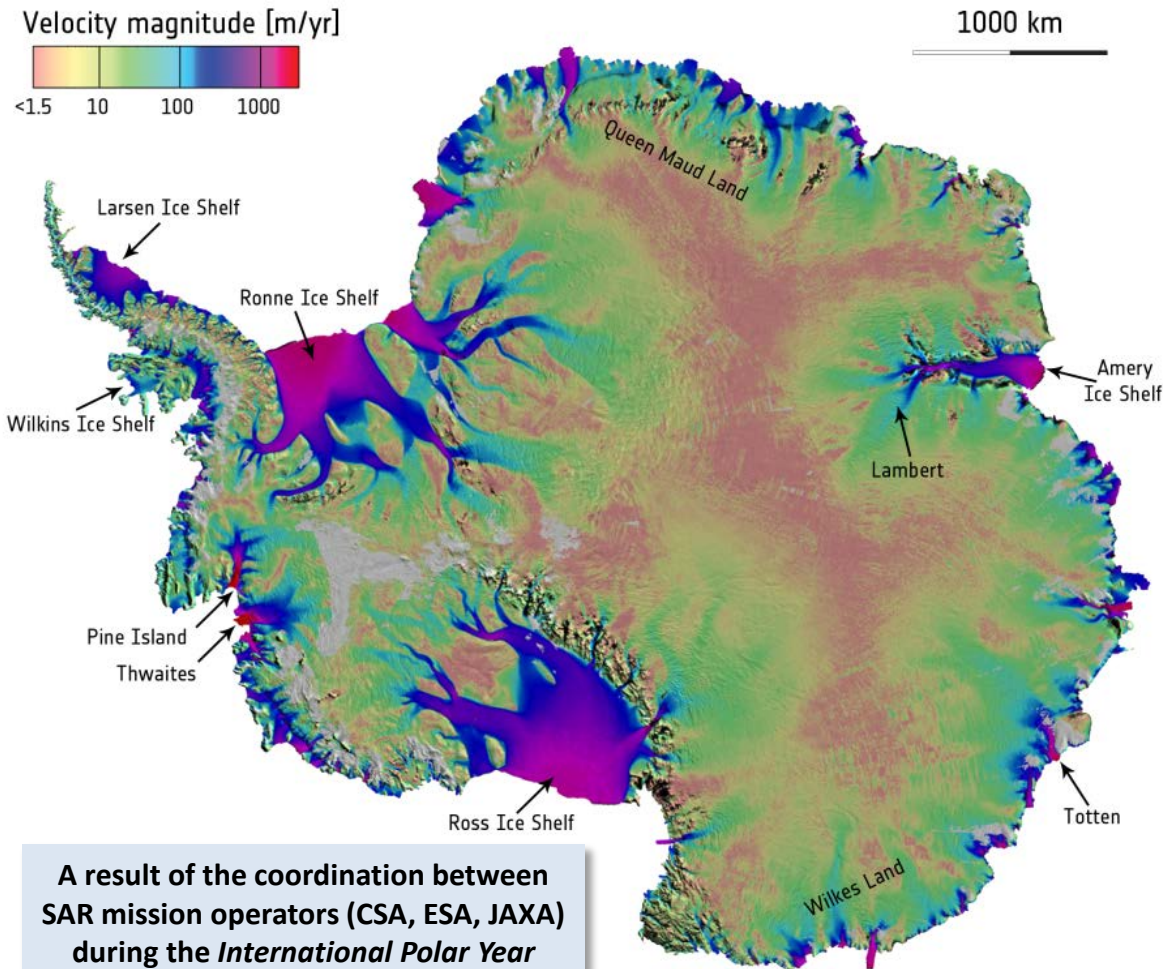
→ The **ERS-2 ice phase in 2011** (3-day repeat), identical to the ERS-1 ice phase of 1992 & 1994

**Kangerdlugssuaq  
Ice Stream  
(East Greenland)**



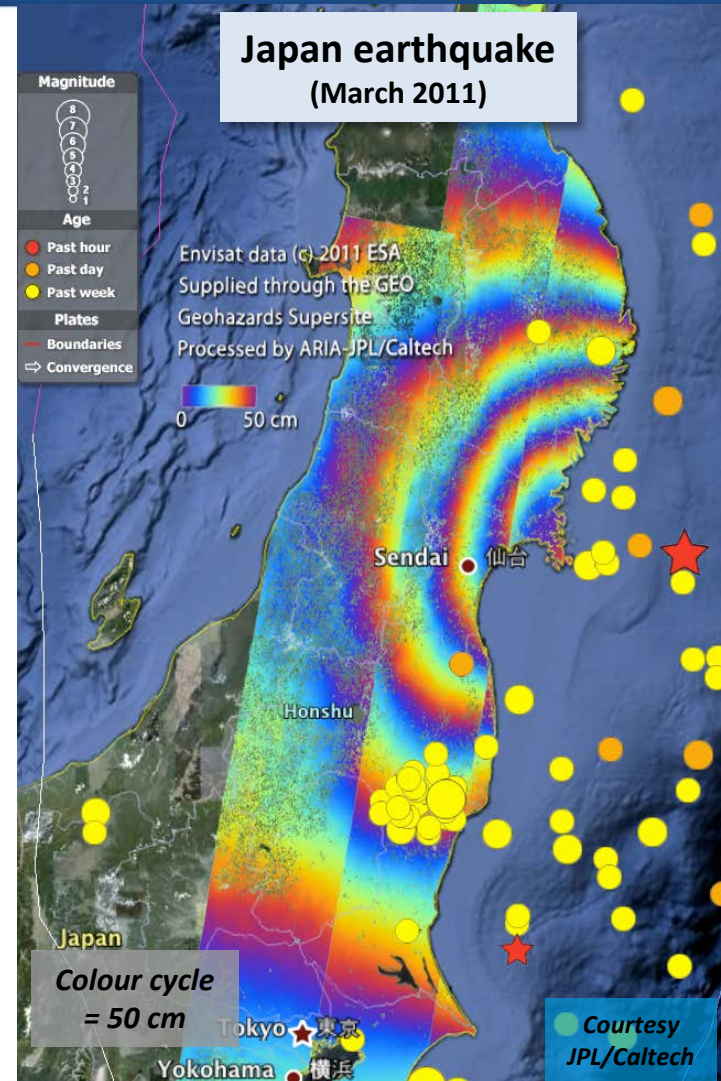


# Envisat mission: → the large scale exploitation of InSAR



A result of the coordination between  
SAR mission operators (CSA, ESA, JAXA)  
during the International Polar Year  
2007-2008

*E. Rignot et al., Science, September 2011*



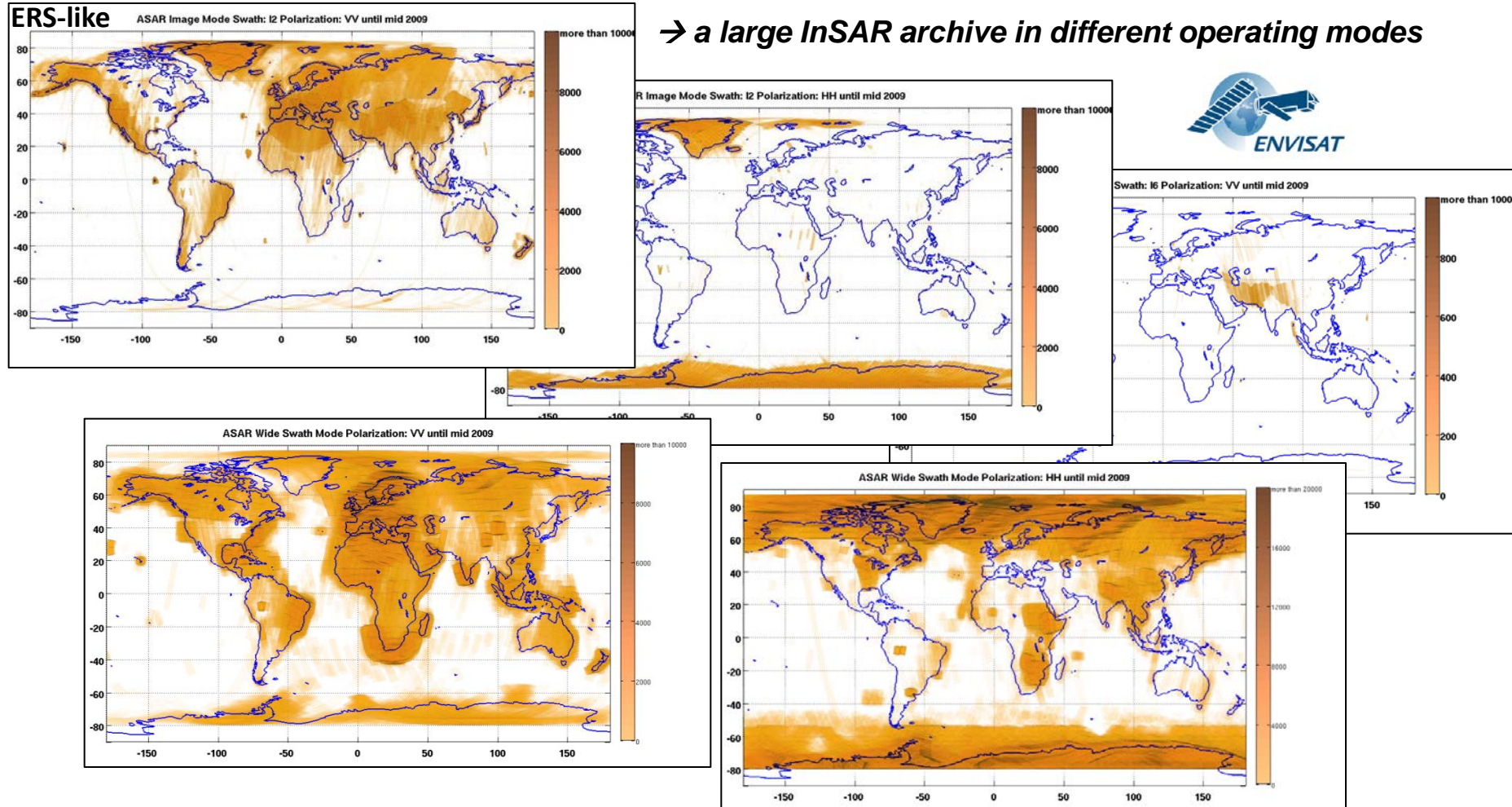


# Envisat mission: → the large scale exploitation of InSAR



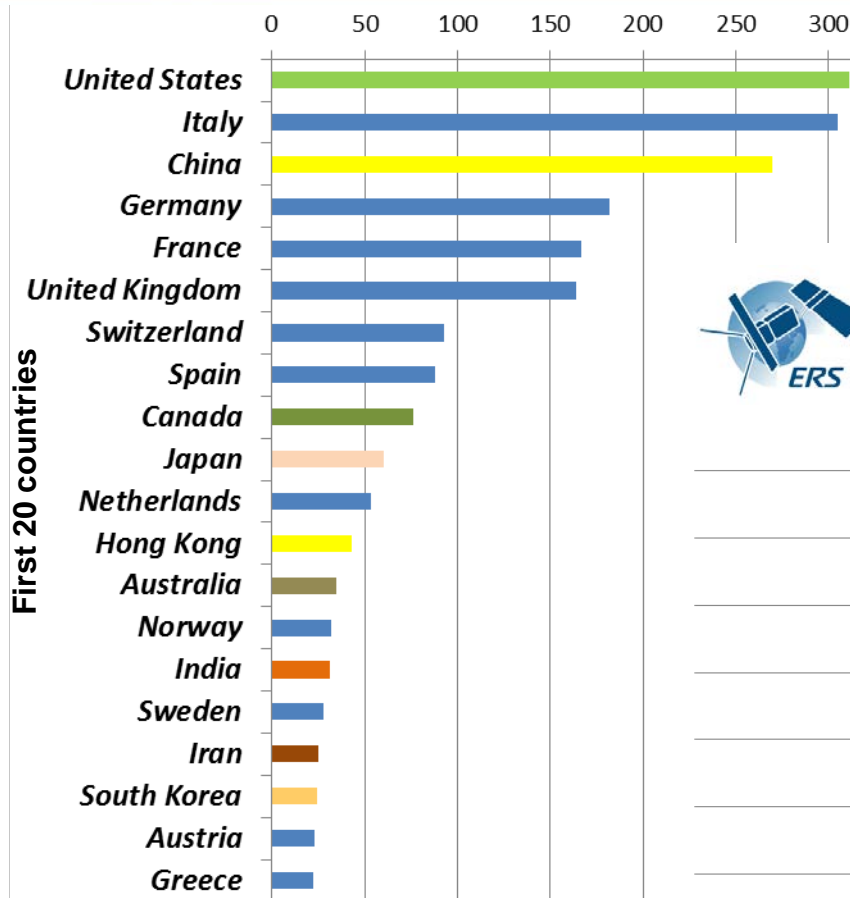
## Envisat ASAR data

→ a large InSAR archive in different operating modes

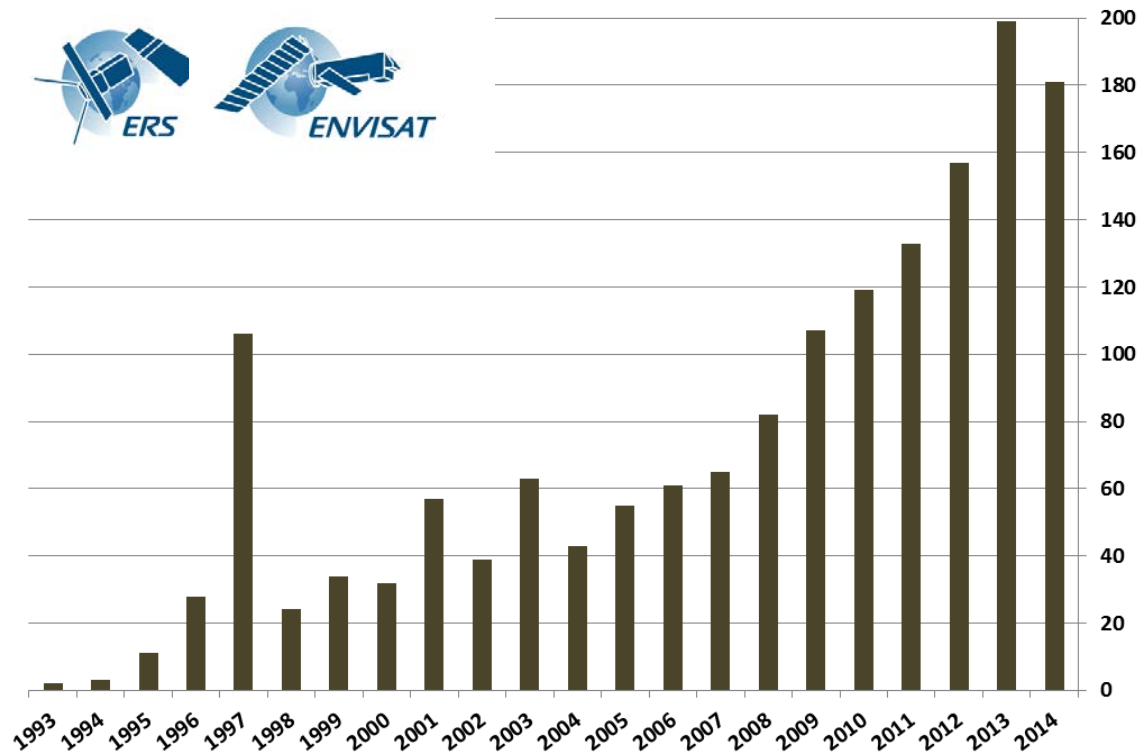




# A large impact in the scientific literature



*Per-reviewed journal papers based  
on SAR interferometry and  
on ERS or Envisat data*



Method: Scopus database, Journal papers with search on: "ERS or Envisat and SAR Interferometry"



**A constant objective:**

**→ ease access to *Earth Observation data***

- q **Common objective for all missions data handled by ESA:**  
Envisat, ERS, Earth Explorers, Sentinel and Third Party Missions
- q **ESA and EC EO data policy → open and free of charge**
- q **Development of alternative ways to use the data (concept of exploitation platforms, toolboxes)**
- q **Maintain effort in improving quality of products (algorithms, validation)**
- q **Stimulate the innovation with EO data both with scientists and value adding industries**

**→ see following presentation on *Geohazards Exploitation Platform***



As for the last 25 years, ESA is committed to continue its support to the InSAR user communities by:

- ❑ operating the ***Sentinel-1 mission*** (2 satellites) on behalf of the European Commission,
- ❑ preserving its ***large InSAR archive*** (ERS, Envisat, Third Party Missions) and stimulating its exploitation,
- ❑ maintaining the effort in ***facilitating the use*** of SAR data,
- ❑ seeking reinforced ***partnerships*** with other SAR operators.