

# Welcome and Introduction

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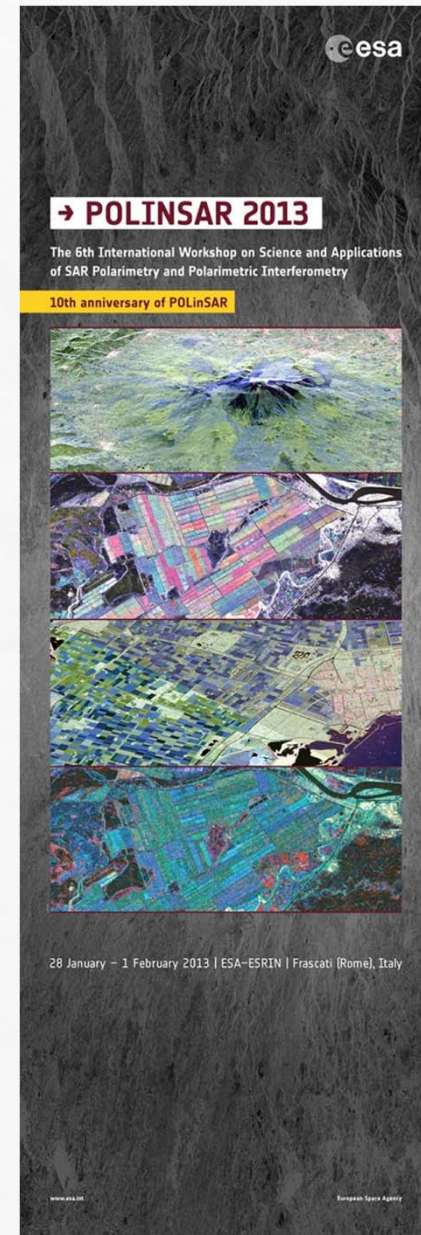
# The POLinSAR Workshops History



- The bi-annual ESA workshop on *Science and Applications of SAR Polarimetry and Polarimetric Interferometry*
- POLinSAR 2013 is the 6<sup>th</sup> in the series with more than 160 registered participants from 32 Countries
- Celebrating the 10<sup>th</sup> Anniversary of POLinSAR



➤ POLIN SAR 2011 GROUP PICTURE



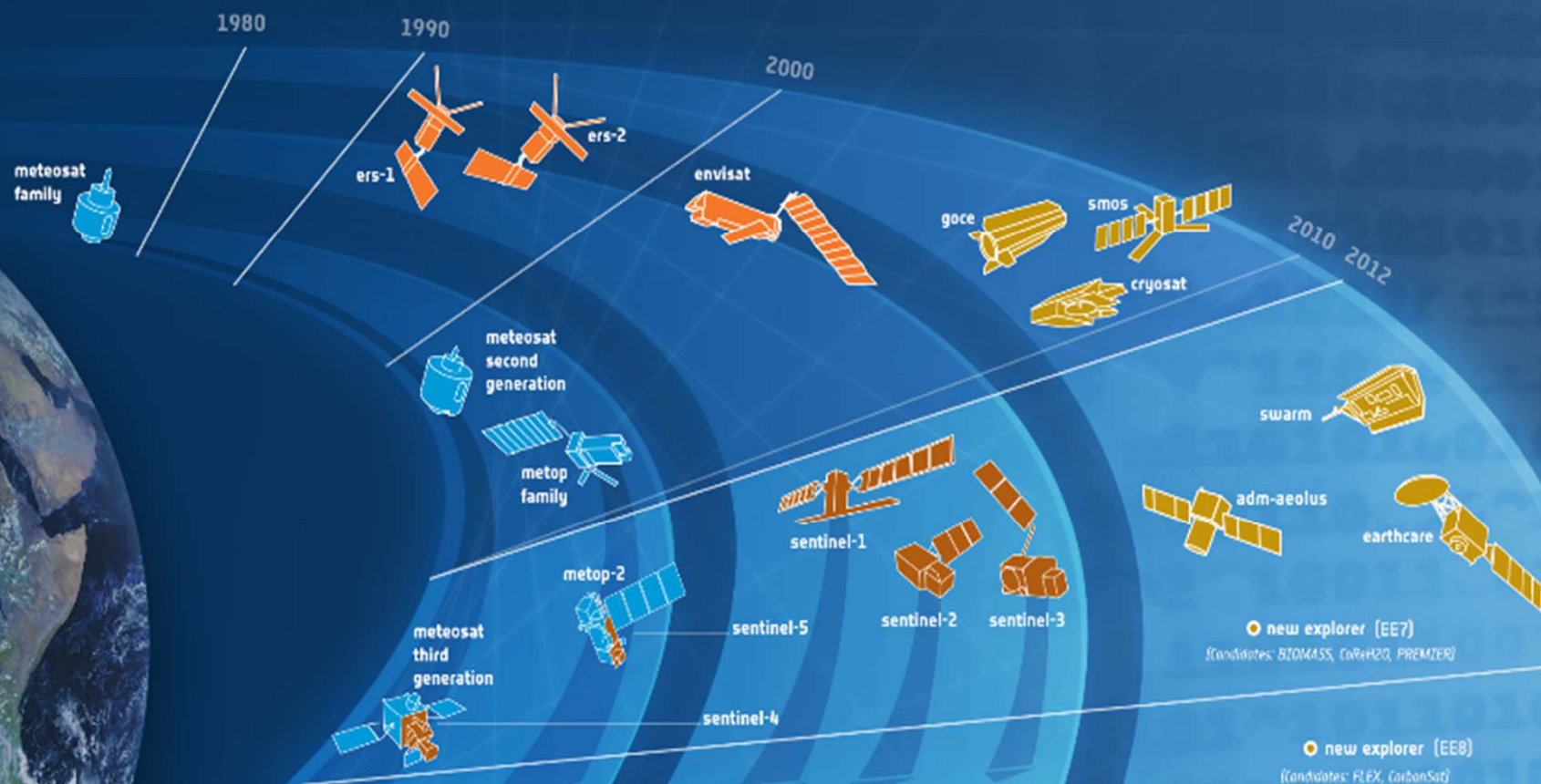
→ POLINSAR 2013

28 January - 1 February 2013 | ESA-ESRIN | Frascati (Rome), Italy

European Space Agency

# → OBSERVING EARTH FROM SPACE

Expanding European Earth Observation capability



## Meteorological Missions

driven mainly by Weather forecasting and Climate monitoring needs. These missions developed in partnership with EUMETSAT include the Meteorological Operational satellite programme (MetOp), forming the space segment of EUMETSAT's Polar System (EPS), and the new generation of Geostationary Meteosat satellites (MSG & MTG satellites).

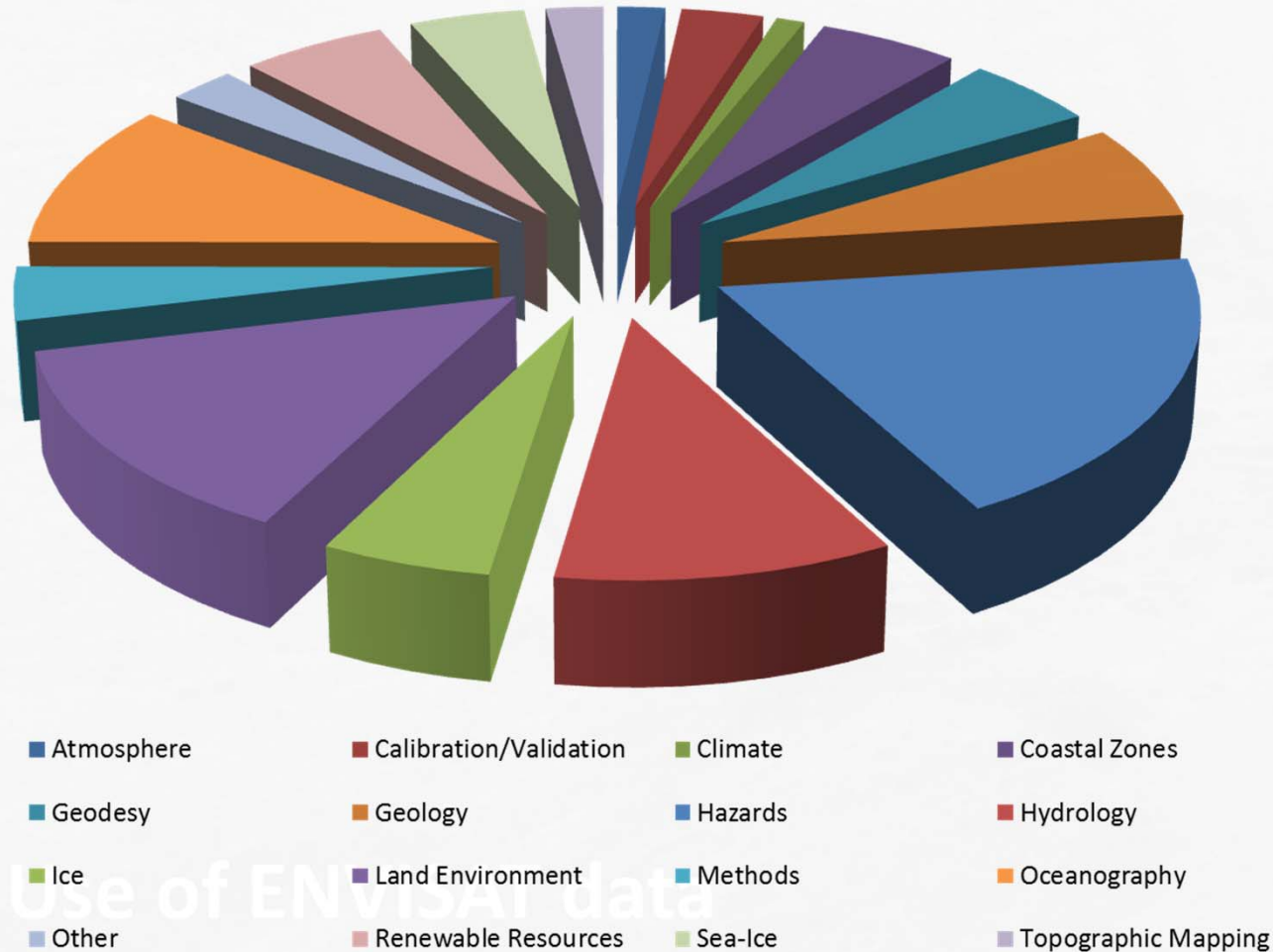
## GMES Sentinel Missions

driven by Users needs to contribute to the European Global Monitoring of Environment & Security (GMES) initiative. These satellite missions developed in partnership with the EC include C-band imaging radar (Sentinel-1), high-resolution optical (Sentinel-2), optical and infrared radiometer (Sentinel-3) and atmospheric composition monitoring capability (Sentinel-4 & Sentinel-5 on board Met missions MTG and EPS-SG respectively).

## Earth Explorer Missions

driven by Scientific needs to advance our understanding of how the ocean, atmosphere, hydrosphere, cryosphere and Earth's interior operate and interact as part of an interconnected system. These Research missions, exploiting Europe's excellence in technological innovation, pave the way towards new development of future EO applications.

# ASAR Projects: Distribution by Theme



Close to 3000 Projects from 107 different countries exploit ASAR data for R&D

# POLINSAR 2013 CONTEXT

- **POLINSAR 2013** is organised in the framework of **SEOM (Scientific Exploitation of Operational Missions)** element of **EOEP-4**
- **SEOM element objectives :**
  - Federate, support and expand the research community
  - Strengthen the leadership of European EO research community
  - Enable the science community to address new scientific research
- **SEOM element work plan** is based on the recommendations gathered in international science users consultations

The screenshot shows the SEOM website homepage. At the top, there is a navigation bar with 'ESA', 'SEOM', 'OBJECTIVES', 'ACTION LINES', 'EVENTS', and 'NEWS'. Below this, there are links for 'ESA EO', 'GMES', 'SENTINELS', 'NEW OPPORTUNITIES' (with a sub-link for 'Invitations to Tender'), 'PARTNERS', 'PROJECTS', 'CALENDAR', and 'CONTACTS'. The main content area features a large banner for the 'living planet symposium 2013' in Edinburgh, Scotland, from 09-13 September. To the right of the banner is a globe. Below the banner, there is a section titled 'The SEOM (Scientific Exploitation of Operational Missions) element:' followed by a paragraph: 'The prime objective of the SEOM element of the Earth Observation Envelope Program 4 is to federate, support and expand the large international research community that the ERS, ENVISAT and the Envelope programmes have build up over the last 20 years. It aims to further strengthen the international leadership of European Earth Observation research community by enabling them to extensively exploit observations from future European operational EO missions. SEOM will enable the science community to address many new avenues of scientific research that will be opened by free and open access to data from operational EO missions.' On the right side of the page, there are several smaller promotional tiles for 'living planet symposium 2013', 'POLINSAR 2013', '2nd ADVANCED COURSE ON RADAR POLARIMETRY', and '4th ADVANCED TRAINING COURSE IN LAND REMOTE SENSING'.

Please visit <http://seom.esa.int>

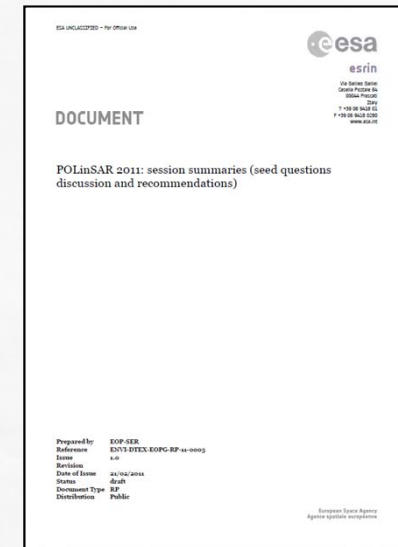
Ref. ESA/PB-EO(2011)122, rev. 1A, 22-23 February 2012, EOEP-4 will span the period 2013-2017,



# Science User consultation & feedback process



## RECOMMENDATIONS



## REPORTING



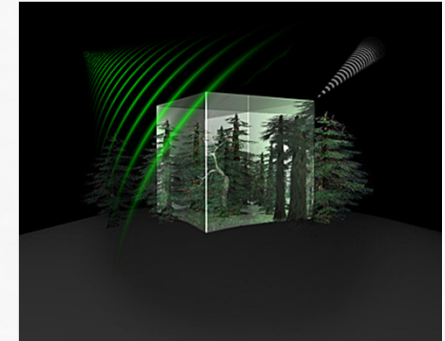
## ACTION

<b>R&amp;D</b>
<b>New Methods</b>
<b>Toolboxes / Trainings</b>
<b>Demonstrations</b>

**Continuous feedback and inputs from the science community to facilitate effective planning and subsequent implementation of exploitation activities**

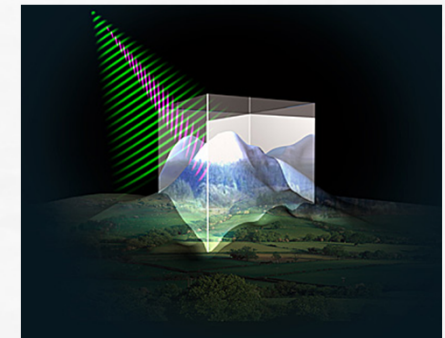
## BIOMASS

A single satellite carrying a **P-band SAR** to provide continuous global interferometric and **polarimetric radar observations** of forested areas



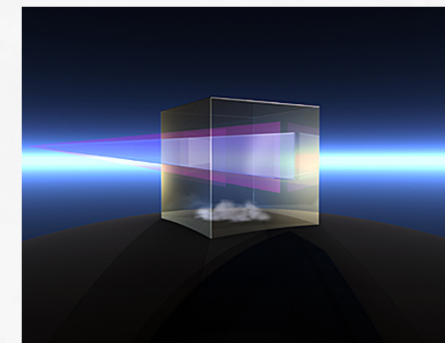
## CoReH2O

Single SAR to **polarisation resolution**



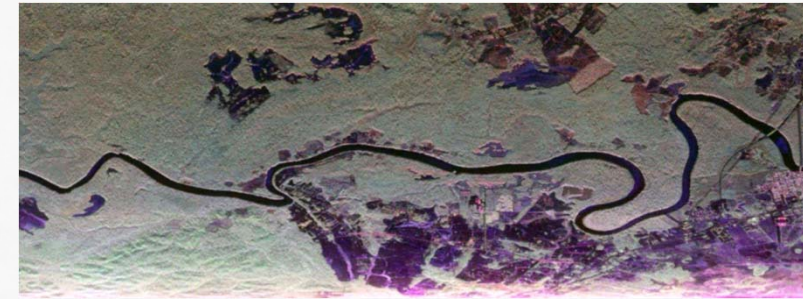
## PREMIER

3D fields of **atmospheric composition** in upper troposphere and lower stratosphere with an **infrared limb-imaging spectrometer** and a **mm-wave limb-sounder**



**User Consultation Meeting to discuss and recommend a candidate mission on 5-6 March 2013 in Graz, Austria. Selection at May 2013 PB-EO.**

- **ROVE (X- ka band)**
  - Agricultural Farms, The Netherlands
- **CryoVEx (Ku- band radar altimeter)**
  - Sea and land Ice, Arctic
- **POLARIS (P band)**
  - Ice, Antarctica and Greenland
- **SnowSAR (X- and Ku-band )**
  - Snow and Forest, Lapland (Finland)
- **NoSREx (X- and Ku-band )**
  - Snow, Sodankyla (Finland)
- **BioSAR (P- and L-band)**
  - Semi-boreal and boreal forest, Sweden
  - E2E performance, prototype L2 products, temporal coherence, topographic correction (BIOMASS)
- **TropiSAR 2009 (P- and L-band)**
  - Tropical Forest, French Guyana
  - E2E performance, prototype L2 products, temporal correlation
- **AgriSAR 2009 (C-band)**
  - Simulate Sentinel-1 data products (frequent observations, resolution)
- **TropiScat 2011**
  - P-band tower scatterometer (long-term temporal coherence, tomography)



➤ TropiSAR – Paracou site



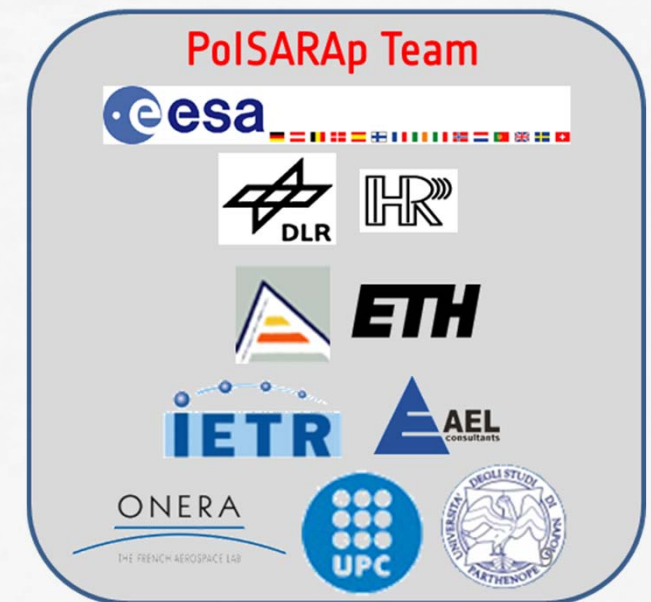
➤ Sodankylä, SnowSAR 2011



# ESA TPM & Exploitation



- ESA campaign data available via **EOPI** (Currently 40 campaign datasets available and campaigns reports)
- ESA providing access to ALOS data for European, Middle East, African PI's
- ESA organising campaigns to collect Polarimetric data for future mission preparation (**AGRISAR** campaign for SENTINEL 1), CSA/ESA **SOAR EU**
- **PolSARAP** (Exploitation of Fully Polarimetric SAR Data for Application Demonstration) study on going and results presented at POLINSAR 2013
  - **Publication** on Radar Polarimetry Theory and Applications in preparation



## POLSARPRO

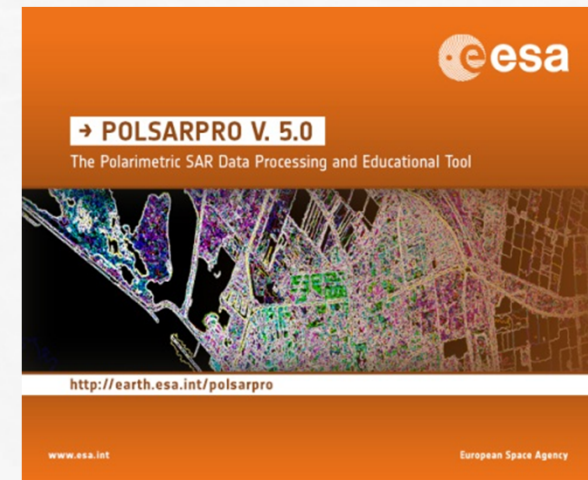


- Developed under ESA Contract to be accessible to a wide range of users from novices to experts in the field of POLSAR and POL-InSAR
- Educational Software offering a tool for self-education in the field of **POLSAR** and **POL-InSAR** data processing and analysis

## Supported Polarimetric SAR datasets

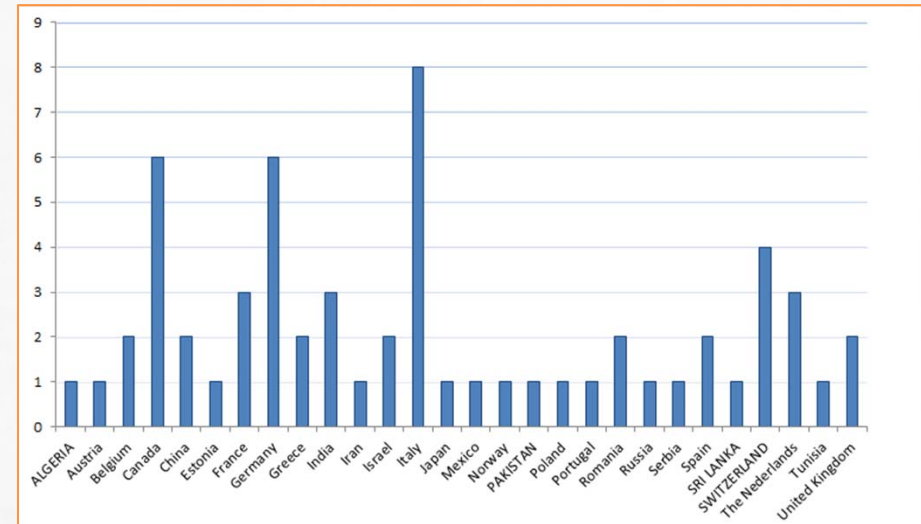
<b>Airborne</b>	<b>Spaceborne</b>
AIRSAR & TOPSAR	SIR-C
EMISAR	Envisat ASAR
E-SAR	RADARSAT-2
Pi-SAR	ALOS PALSAR
SAR580-Convair	TerraSAR-X
RAMSES, UAVSAR etc.	Tandem-X, Cosmo-SkyMed etc.

<http://earth.esa.int/polsarpro>



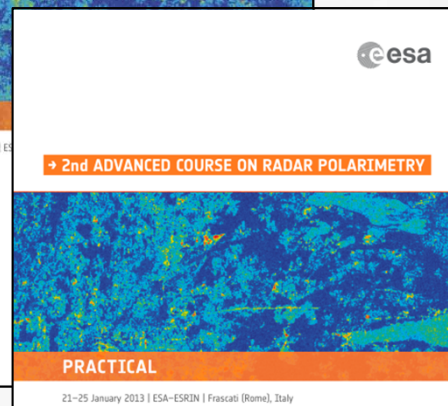
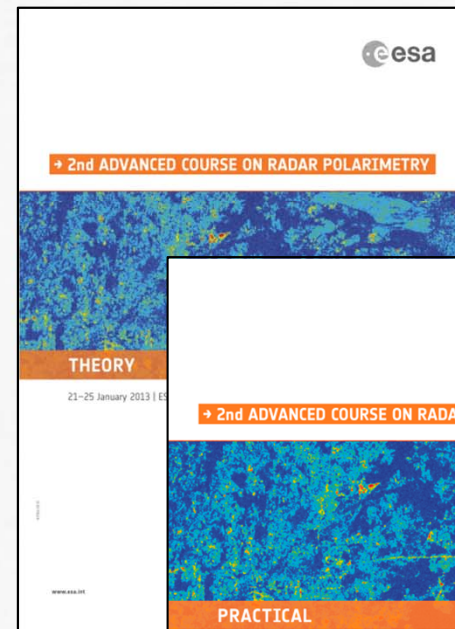
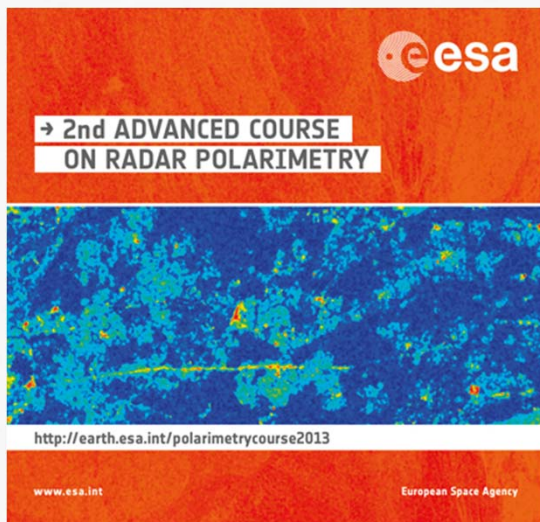
# Training on Radar Polarimetry

- 2<sup>nd</sup> Advanced Training on Radar Polarimetry 21 to 25 January 2013
- 60 selected participants
- Education levels: 48% PhD student, 44% PostDoc/Researcher/Professor, 8% MSc
- 26 different nationalities represented



## 10 leading scientists from 6 Countries as Lecturer Team

- Prof. Wolfgang-Martin Boerner
- Dr. Laurent Ferro-Famil
- Dr. Shane Cloude
- Prof. Irena Hajnsek
- Dr. Carlos Lopez-Martinez
- Dr. Konstantinos Papathanassiou
- Dr. Marco Lvalle
- Dr. Stefano Tebaldini
- Dr. Elise Koeniguer
- Dr. Juan M. Lopez-Sanchez

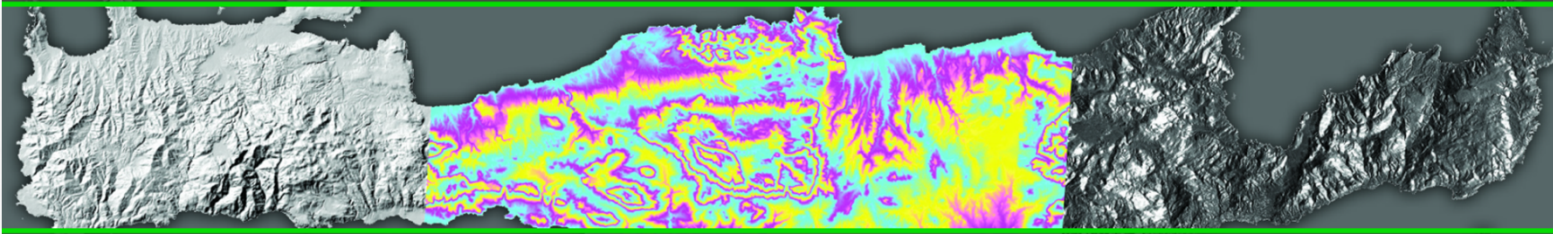




HAROKOPIO UNIVERSITY



## → 4th ADVANCED TRAINING COURSE IN LAND REMOTE SENSING



01-05 July 2013 | Harokopio University | Athens, Greece

- Participation limited to 60 students and subject to selection of application
- On-line Application deadline **28 February 2013**

<https://earth.esa.int/landtrainingcourse2013>

# Forthcoming SAR Missions



Sensor (Satellite)	SAR (Sentinel-1)	PALSAR-2 (ALOS-2)	SAR2000 SG (CSG)	SAR (RCM)
<b>Satellite Repeat Cycle</b>	12 days	14 days	16 days	12 days
<b>Band &amp; Polarimetry</b>	C-band 5.405 GHz Single, Dual	L-Band 1.270 GHz Single, Dual, Quad Pol	X-band 9.6 GHz Single, Dual, Quad Pol	C band 5.405 GHz Single, Dual, Quad Pol (Compact)
<b>Modes/Resolution</b>	Extra-wide swath: 40x20m Wave mode: 5x5m Interferometric wide swath: 20x5m Stripmap: 5x5m	ScanSAR: 100m Stripmap: 3-10m Spotlight: 1-3 m	Dual polarisation modes: ScanSAR: 100m Stripmap: 40m Spotlight: 3m Height: 1m Quad polarisation mode: Ping-Pong: 15m	Low Resolution: 100m Medium Resolution: 50/30/16m High Resolution: 5m Very High Resolution: 3m Ice/Oil Low noise: 100m Spotlight: 1x3m
<b>Swaths</b>	Extra-wide swath: 400 km Wave: sampled interval: 20 x 20 km Interferometric wide swath: 250 km Stripmap: 80 km	ScanSAR: 350 - 490 km Stripmap: 50-70 km Spotlight: 25 km Polarimetry: 30-50 km	Dual polarisation modes: ScanSAR: 100-200 km Stripmap: 40 km Spotlight: 10 km Quad polarisation mode: Ping-Pong: 30 km.	Low Resolution: 500 km Medium Resolution 30-350 km High-Resolution: 30 km Very High Resolution: 20 km Low Noise: 350 km Spotlight: 5 km
<b>Accuracy</b>	Radiometric Accuracy: $\pm 1$ dB (3 sigma); Radiometric stability: 0.5 dB (3 sigma)	Radiometric Accuracy: $\pm 1$ dB	n.a.	Absolute Radiometric Accuracy: $\pm 1$ dB Scansar discontinuities: 0.2 dB
<b>Launch</b>	2013	2013	2015	2016

More information available at: <http://www.eohandbook.com/>

# Upcoming Events



The poster features a central image of a globe with a grid overlay, set against a background of a colorful satellite-style map of Earth. The text is arranged in a clean, modern layout with a grey and white color scheme.

**living planet symposium** | EDINBURGH  
09.13 september **2013**

FIRST ANNOUNCEMENT AND CALL FOR PAPER

European Space Agency

- Strict deadline for on-line abstract submission: **15 February 2013**

<http://www.esa.int/LivingPlanet2013>

**Wishing you a good  
and productive  
workshop**

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European Space Agency