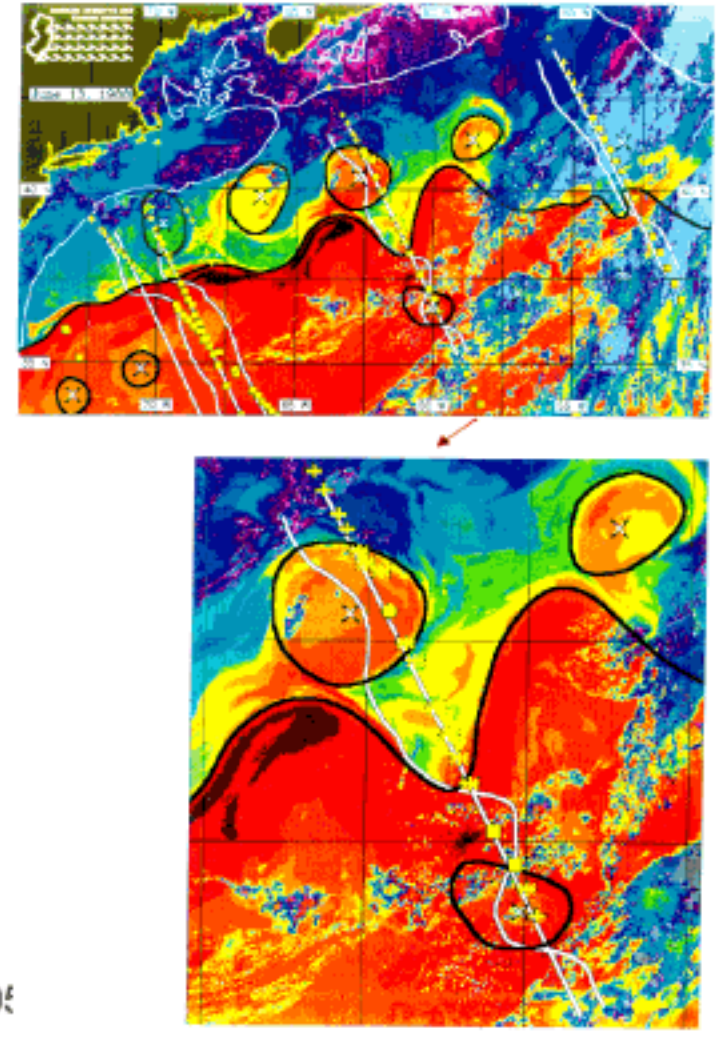
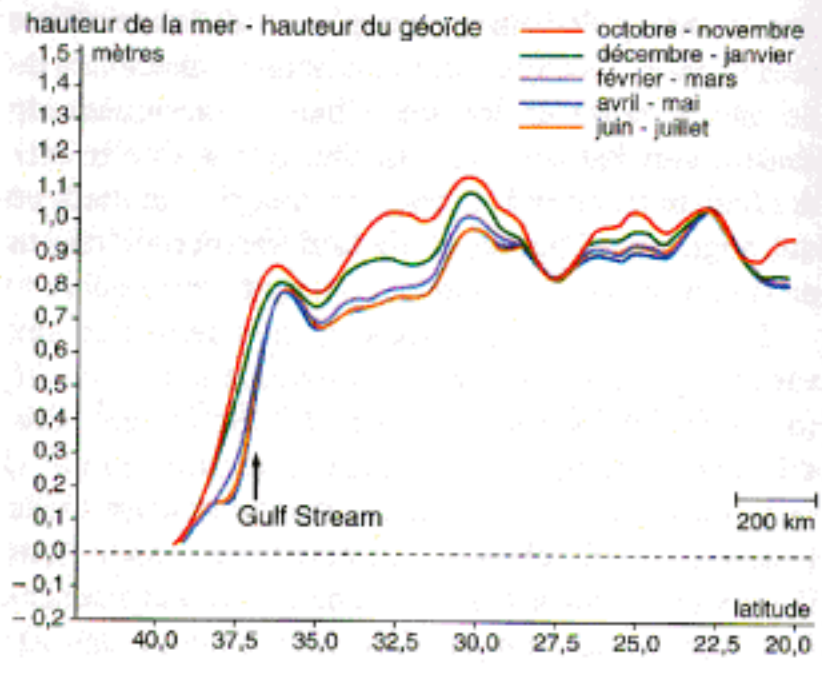
ALTIMETER MISSIONS 2003-2010

Yves Ménard (CNES)

Starting with early missions: Geos 3 (75), Seasat (78), Geosat (85-89), ERS1 (91-94), Altimetry from space has revolutionazed our view of the Ocean



A very accurate measurement of the SSH give us an integrated view of the ocean dynamics



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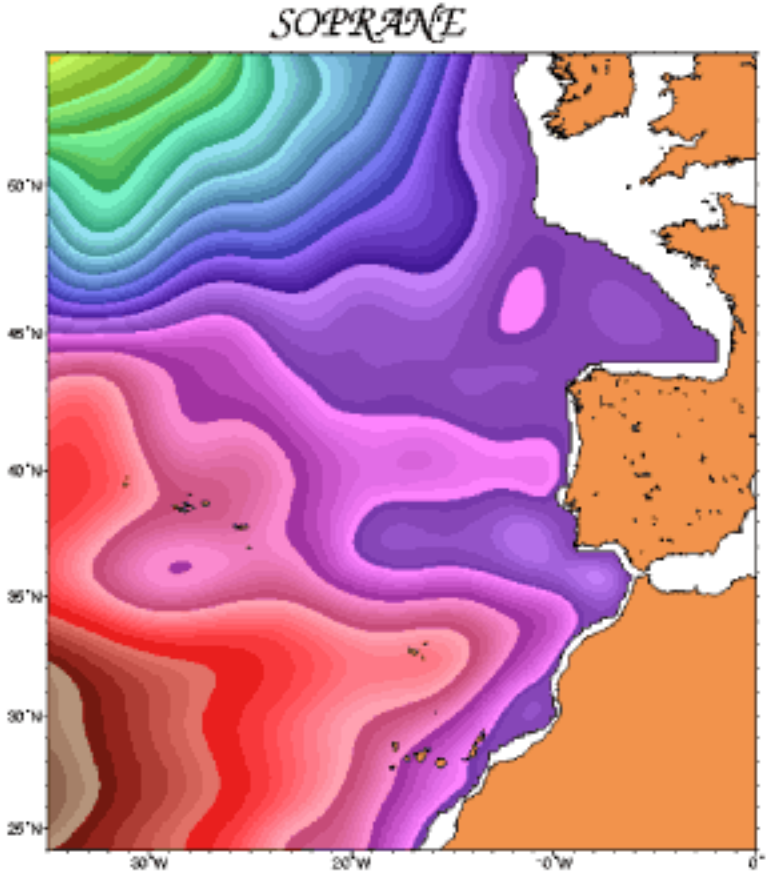
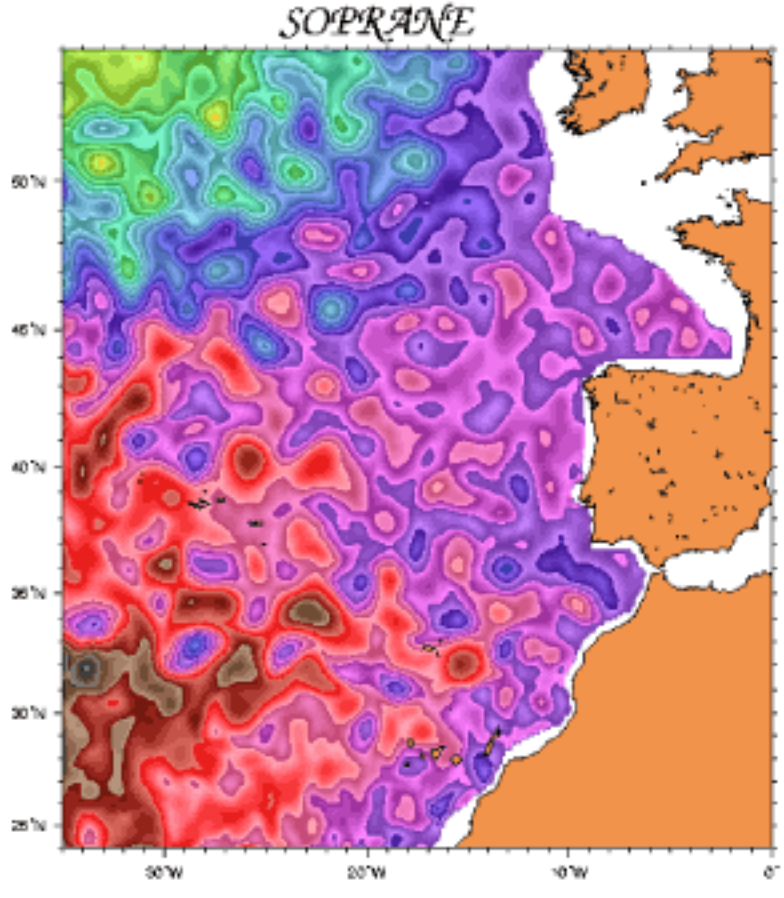
OCEAN VIEWS

Without Altimetry

With Altimetry





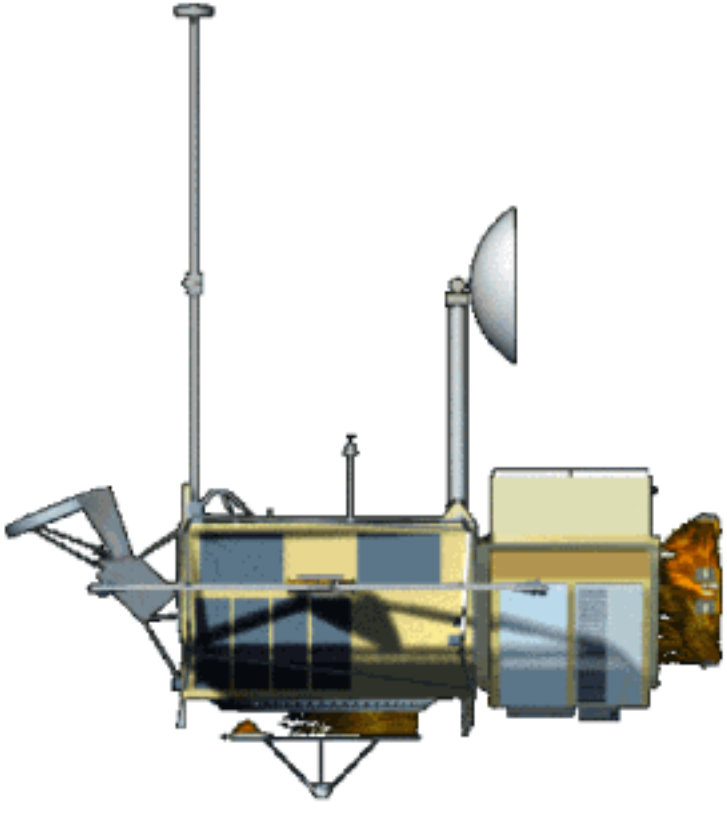
French-USA-ESA flying missions status

- **GFO**: launched in early 98, accepted by Navy on Nov. 2000, after few issues be resolved. I/GDR data delivered by NOAA (since Aug. 2001),
- **ERS2**, still working despite some mispointing problems,
- **ENVISAT**: Successful launch on March 1rst, 2002, Altimeter and Doris measurements OK. Comissionning phase completed.
- **TOPEX/POSEIDON**: Still working well, is on a new interleaved track orbit since September 02 (T/P and Jason are now sampling the ocean two times better). NASA to continue the operations in 2003 --->
- **Jason-1**: launched Dec. 7th 2001, All instruments and ground systems OK. IGDR Data delivered to Pis/CoIs since March 21, in-orbit performances are compliant with pre-launch specifications. GDR distribution to start in June 03.

Continuing 10 Years of High accuracy Satellite Altimetry

TOPEX/POSEIDON

2500 kg, operational since 92

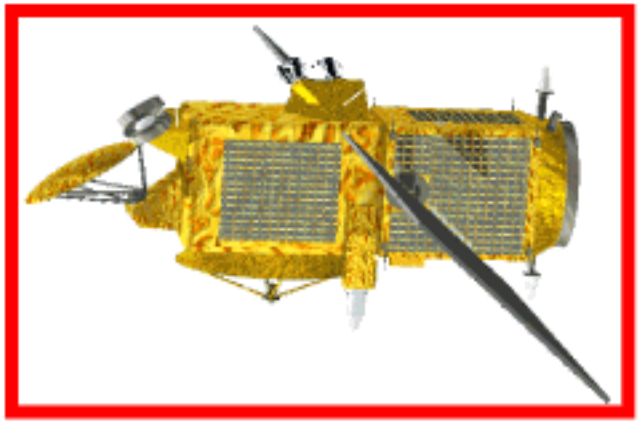


Jason-1

500 kg

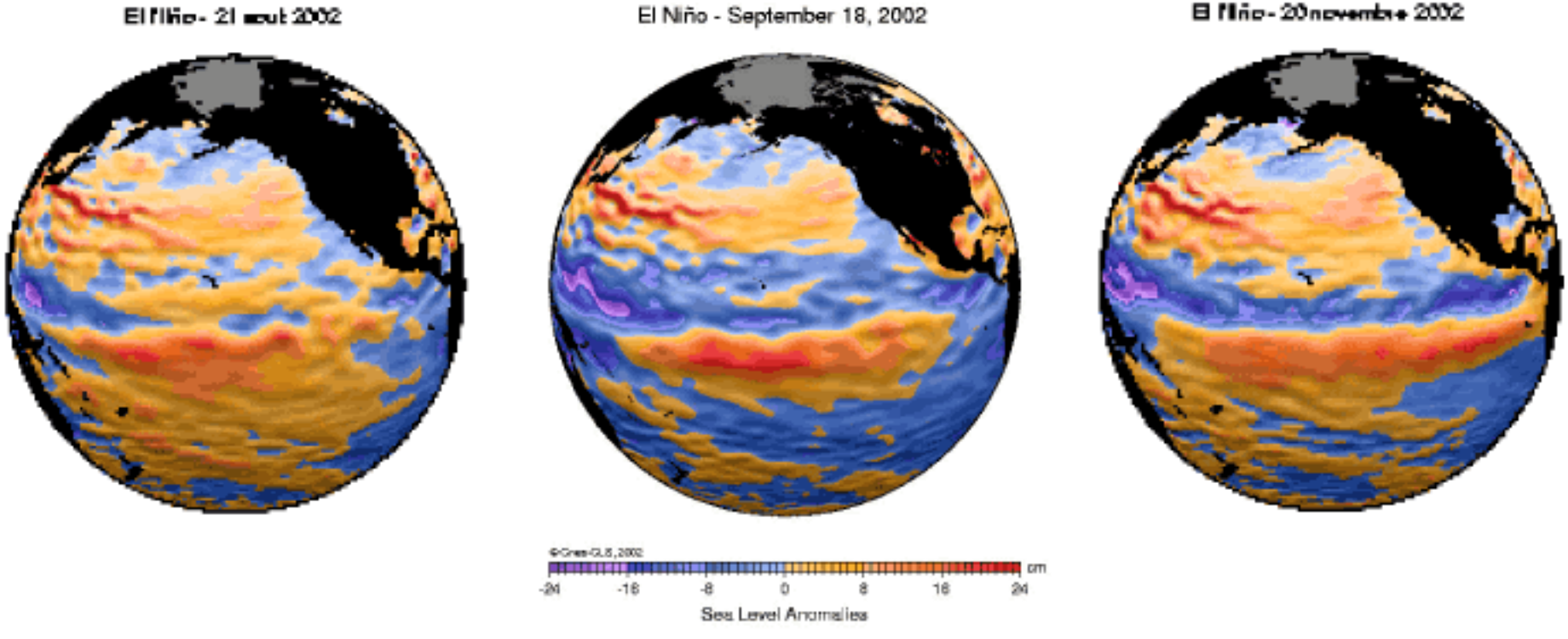
specified with

T/P in-orbit performances

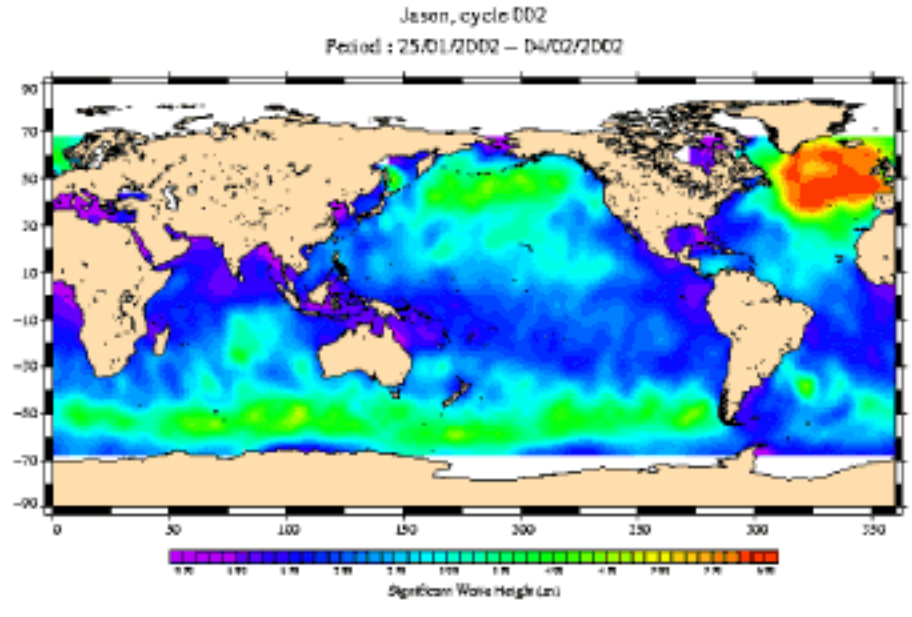


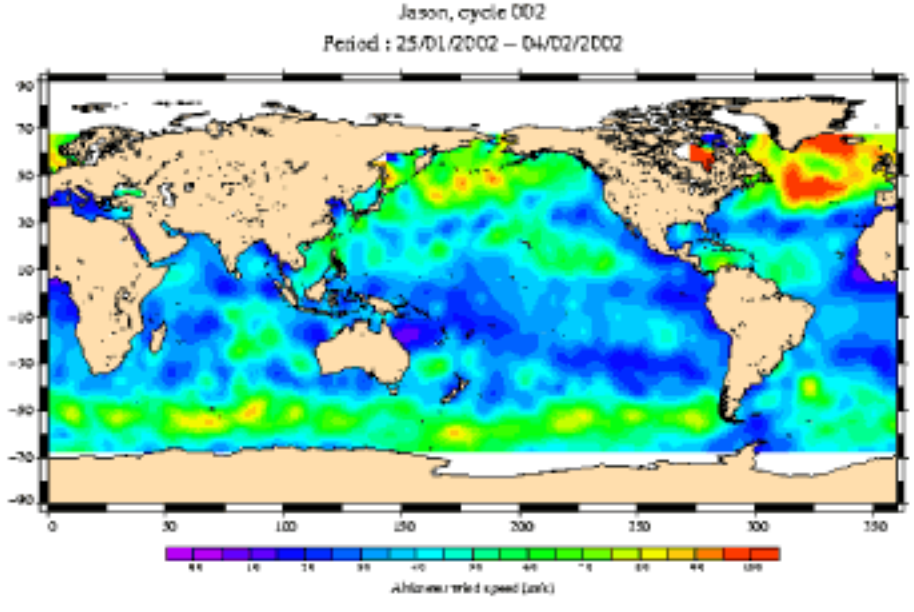
TOPEX/POSEIDON (Aug.1992) ; JASON-1 (Dec.2001)

Jason-1 watching El Nino/La Nina



Jason-1 and ENVISAT measure wave-height and wind speed in near-real time (3 hours delay)



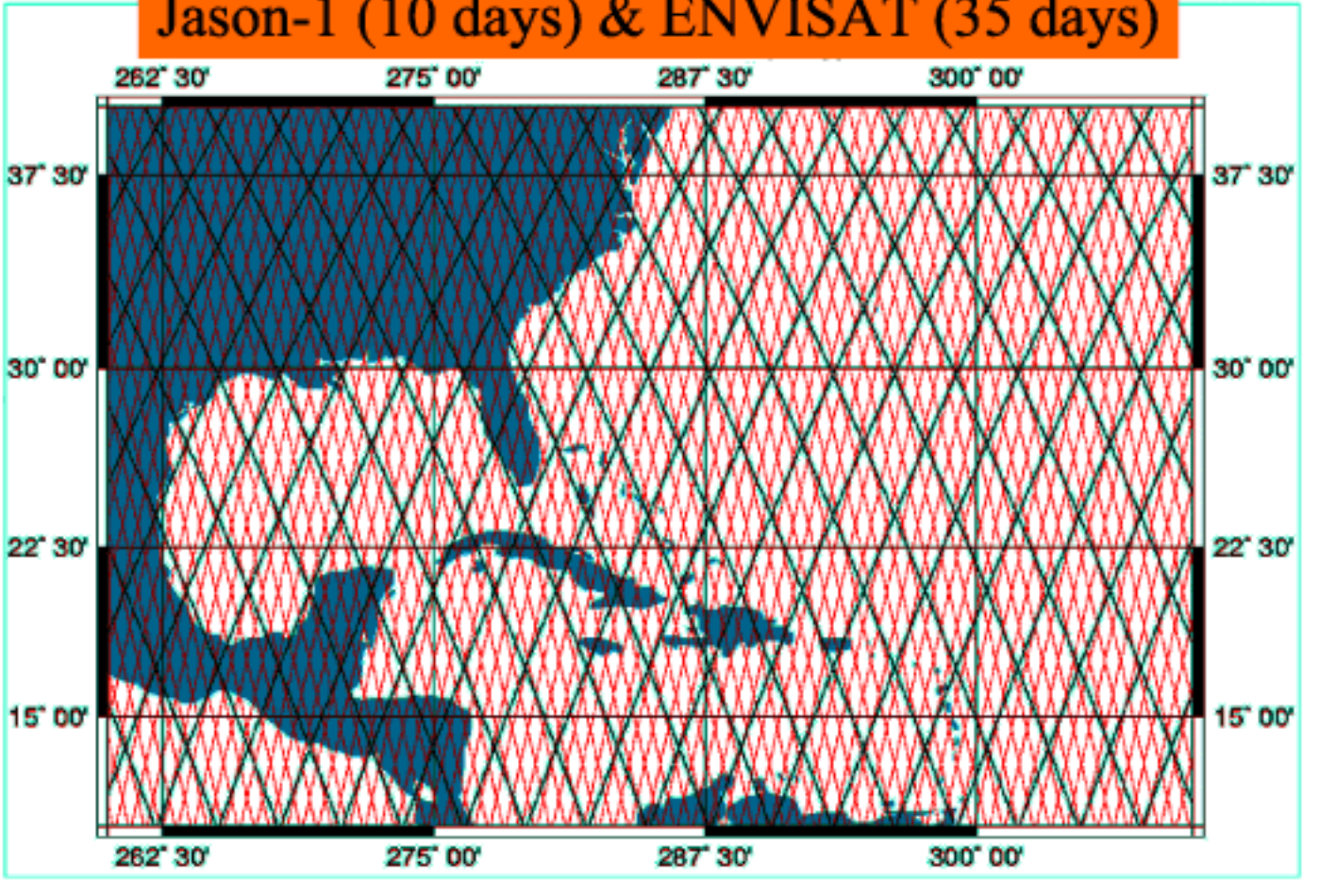


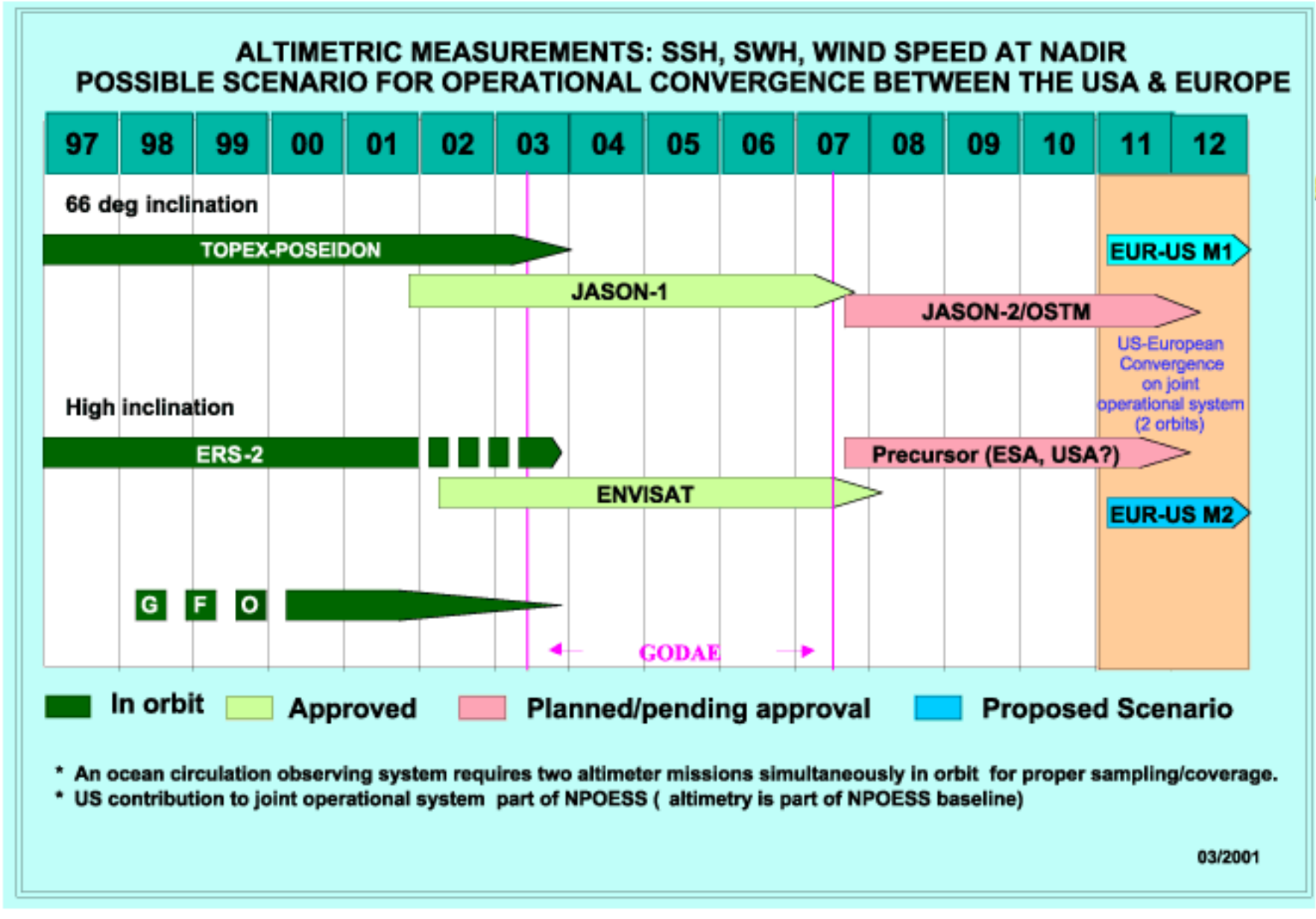
One major priority for the future

- - Maintaining the high accuracy service as provided by T/P and Jason-1 => Jason 2…

- - Providing a complementary sampling to afford a high resolution
  - - by conventional altimeters Altika/GANDER...
  - - by using new concepts => interferometric radars WSOA, SWIMSAT...

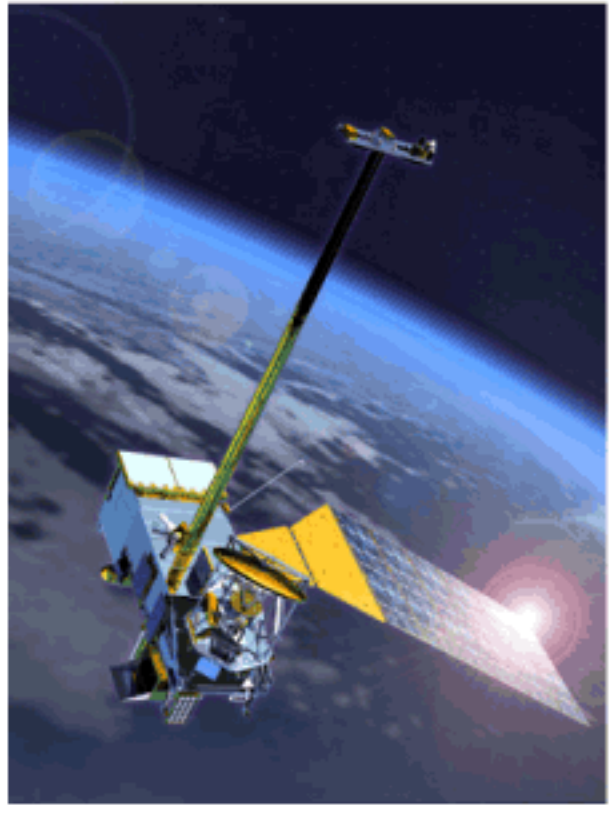
Minimum altimeter sampling




ALTIMETRIC MEASUREMENTS: SSH, SWH, WIND SPEED AT NADIR
POSSIBLE SCENARIO FOR OPERATIONAL CONVERGENCE BETWEEN THE USA & EUROPE
97
98
99
00
01
02
03
04
05
06
07
08
09
10
11
12
66 deg inclination
TOPEX-POSEIDON
JASON-1
JASON-2/OSTM
EUR-US M1
US-European Convergence on joint operational system (2 orbits)
High inclination
ERS-2
Precursor (ESA, USA?)
ENVISAT
EUR-US M2
G
F
O
GODAE
In orbit
Approved
Planned/pending approval
Proposed Scenario
* An ocean circulation observing system requires two altimeter missions simultaneously in orbit for proper sampling/coverage.
* US contribution to joint operational system part of NPOESS (altimetry is part of NPOESS baseline)
03/2001

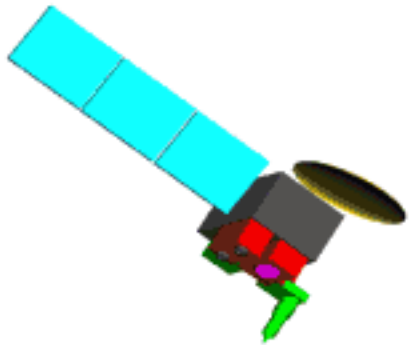
To be launched in 2007

NPOESS altimetric mission (2011?)



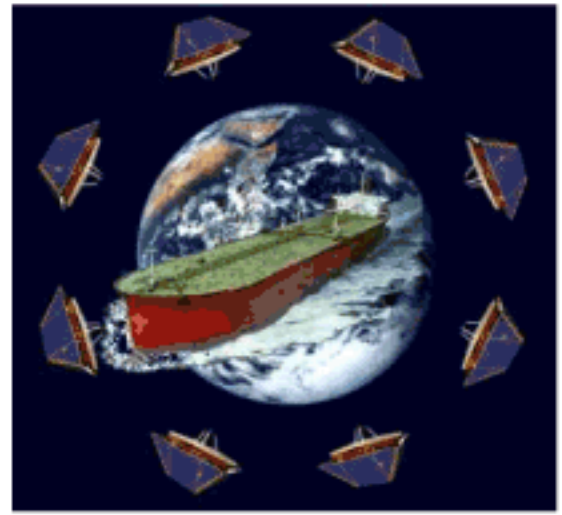
Prospects for the post ENVISAT mission based on constellation of conventional altimeters

Sea surface topography



AltiKa micro satellites (CNES)
Wittex type constellation (APL)

Sea-state

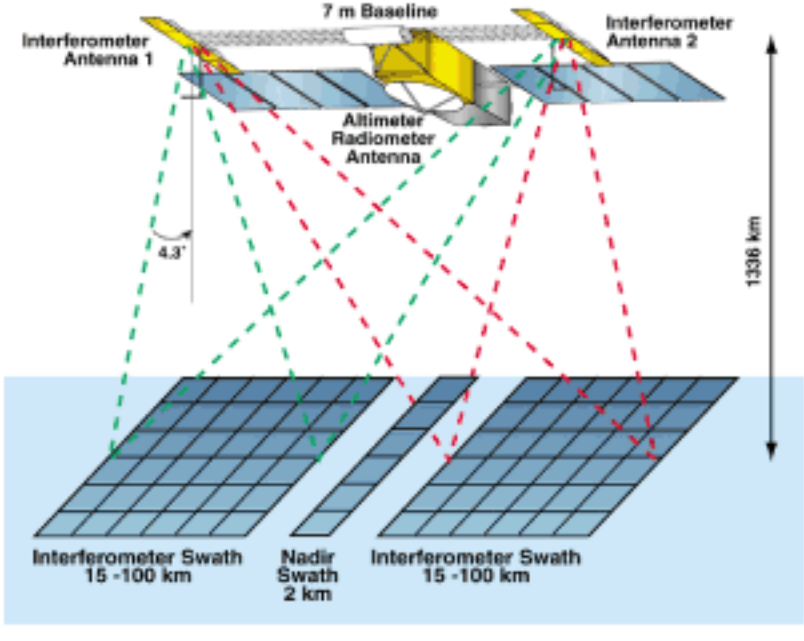


Gander project (SOS)

CONVERGENCE ?

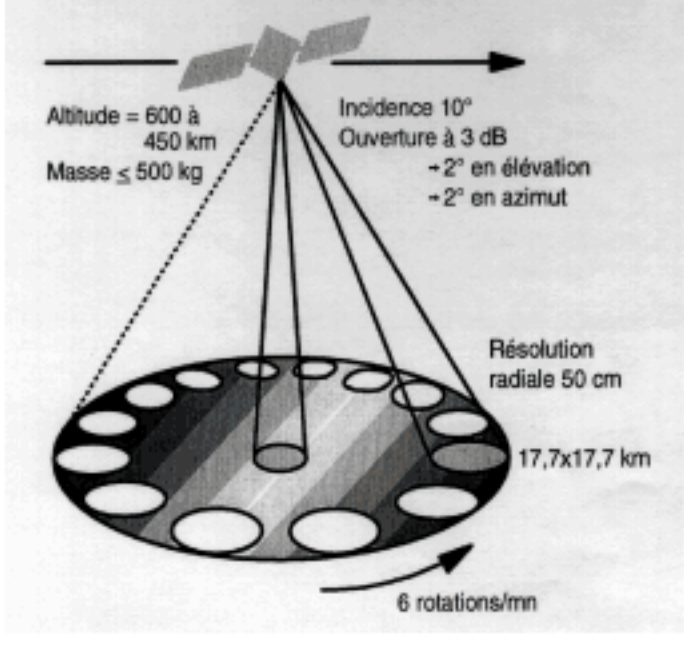
Prospects for the 2010 and beyond
The radar interferometry

SSH and surface currents mapping



WSOA to be demonstrated on-board Jason-2

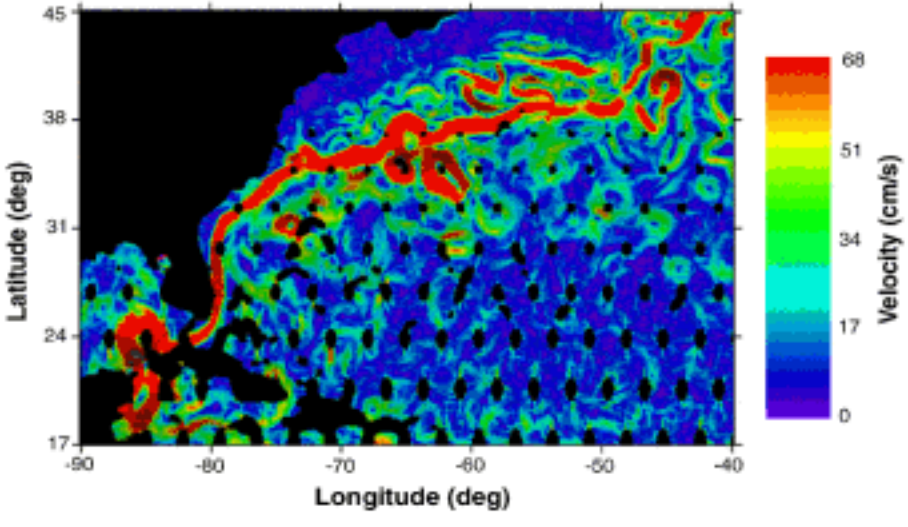
Sea-state spectrum



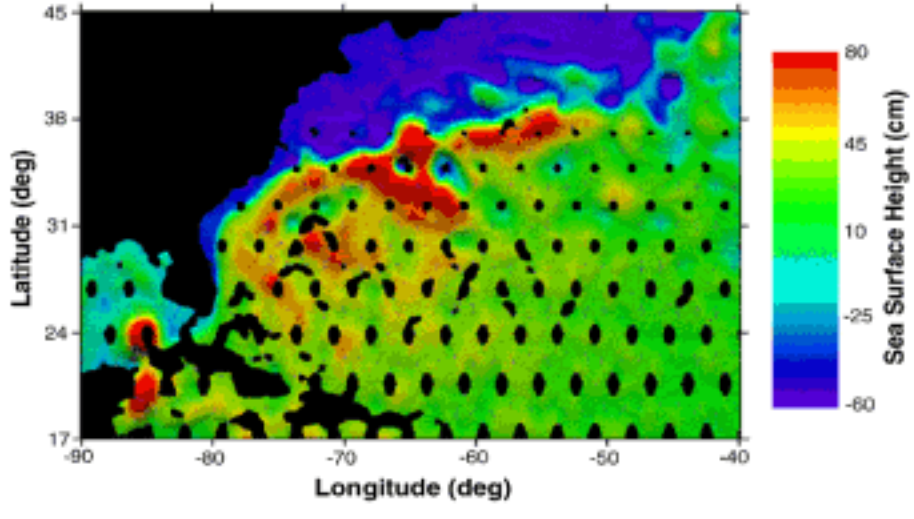
SWIMSAT proposed to ESA AO in 2005-2006

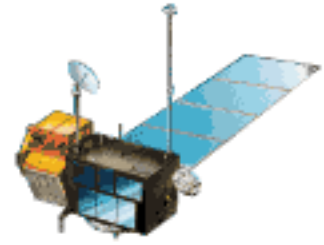
WSOA: A New Generation of Ocean Products

Velocity field

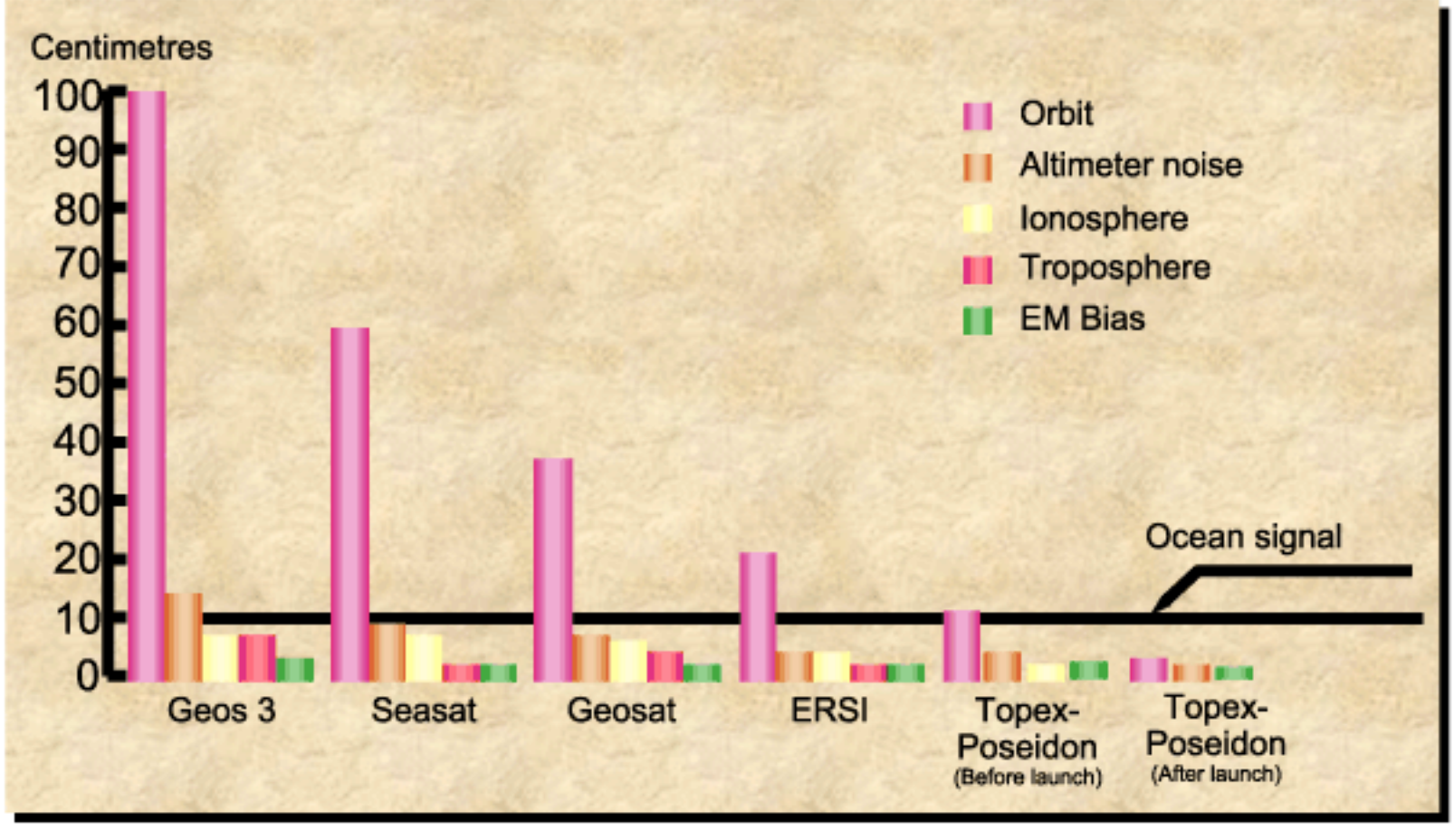


Dynamic topography





Altimetry mission error budgets



WP 8: CONSTELLATION OPTIMIZATION (3)

- **Recommend an optimized convergent strategy for both SSH and Sea-State Objectives**
- **Possible mission scenarios to be evaluated**
  - Take the reference missions Jason 2/OSTM (2007) and...
    - NPOESS, but the first one C3 is scheduled in 2011, the second one C6 in 2018
    - NPOESS free-flyer? Still an option?
  - ENVISAT is designed for a 5 year life-time => 2007-2011 a big «!risk!» of having only one satellite in-flight (Jason2)
  - **=>Mid-term objective (2007-2011): to maintain (and complete) the present ENVISAT/Jason-1 configuration,**
    - Absolute need to fill the potential gap in 2007-2011
    - with «!conventional!» altimetry, i.e. AltiKa/Gander constellation, 1 is a minimum, 3 is much more adapted to various SSH and Sea-State objectives => define multiple mission scenarios to see how they satisfy the different objectives/mission requirements
  - **Long term objective (> 2011), Jason follow-on and NPOESS with Wide Swath Altimeters**
    - WSOA, should be demonstrated on-board Jason2 => potentialy operational in 2011
    - SWIMSAT proposed to ESA in 2002, ranked first on the waiting list, good chance for the new ESA AO in 2005-2006?