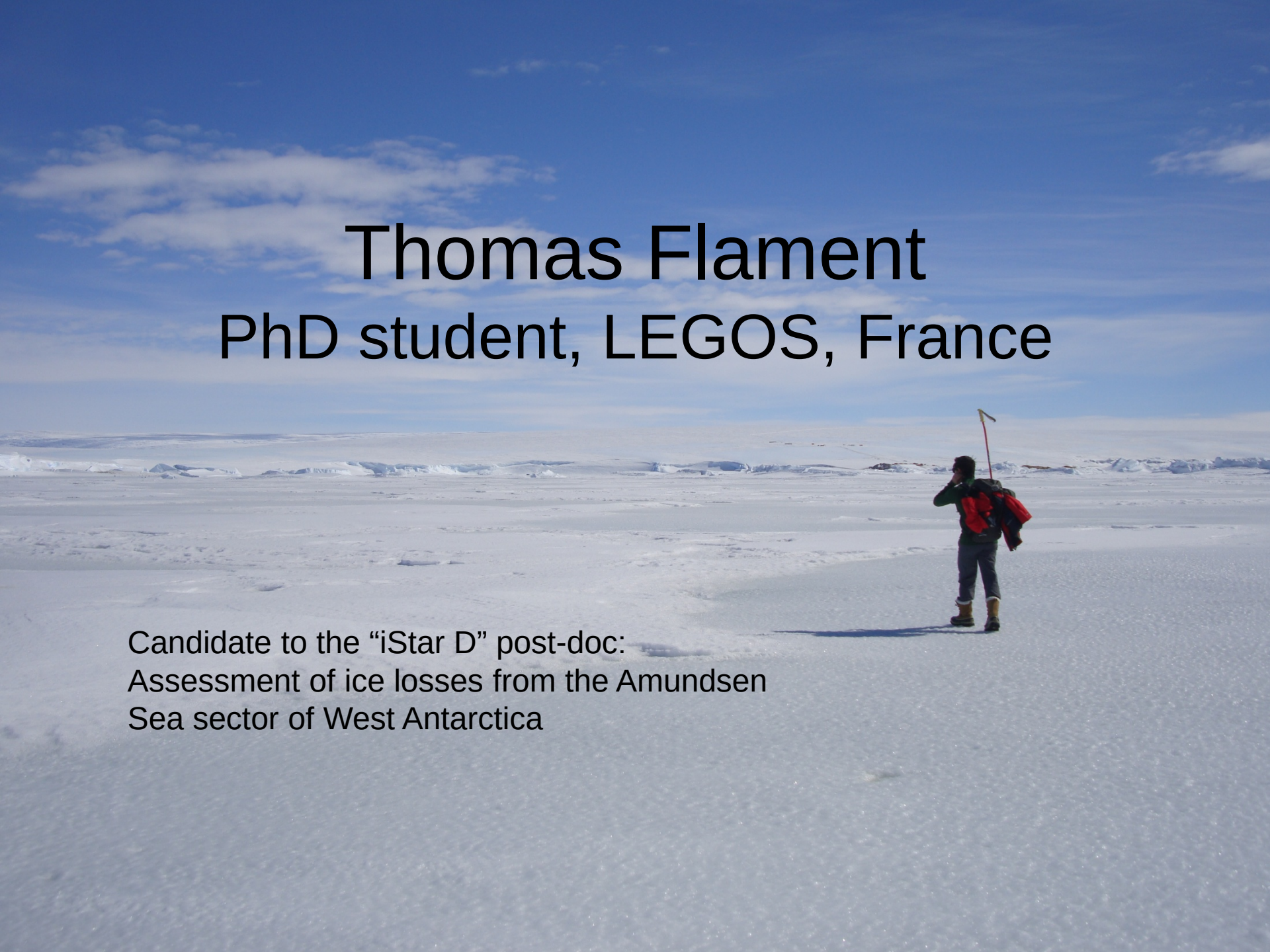
Thomas Flament

PhD student, LEGOS, France



Candidate to the “iStar D” post-doc:
Assessment of ice losses from the Amundsen Sea sector of West Antarctica

Curriculum Vitae

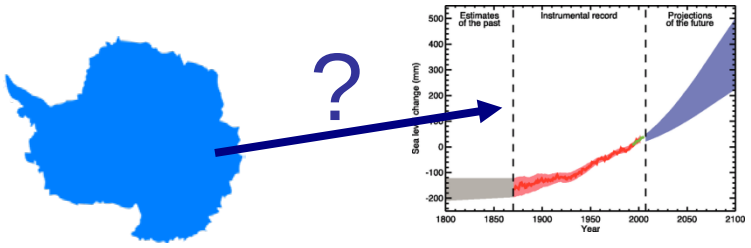
- 2010-2013: Ph.D. candidate, Toulouse
  - Surface elevation change of the Antarctic Ice Sheet from radar altimetry
  - Supervisor: Frédérique Rémy
  - Defence : 18th September

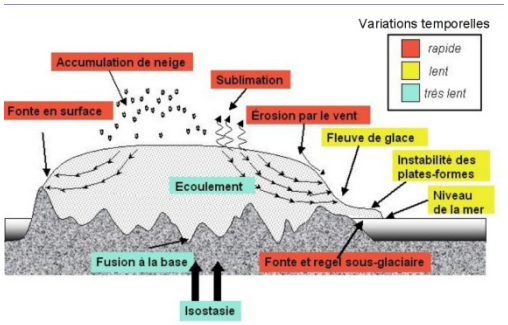
- 2006-2010: M.Sc.:
  - aerospace engineering (2006-2010), Toulouse
  - climate science (2009-2010), Toulouse
  - 2008-2009: industrial placements, Airbus Deutschland (6 months) and DLR (6 months), Germany

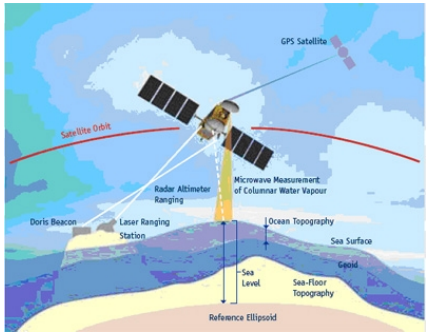
- 2004-2006: undergraduate studies in maths and physics, Montpellier

Research interest

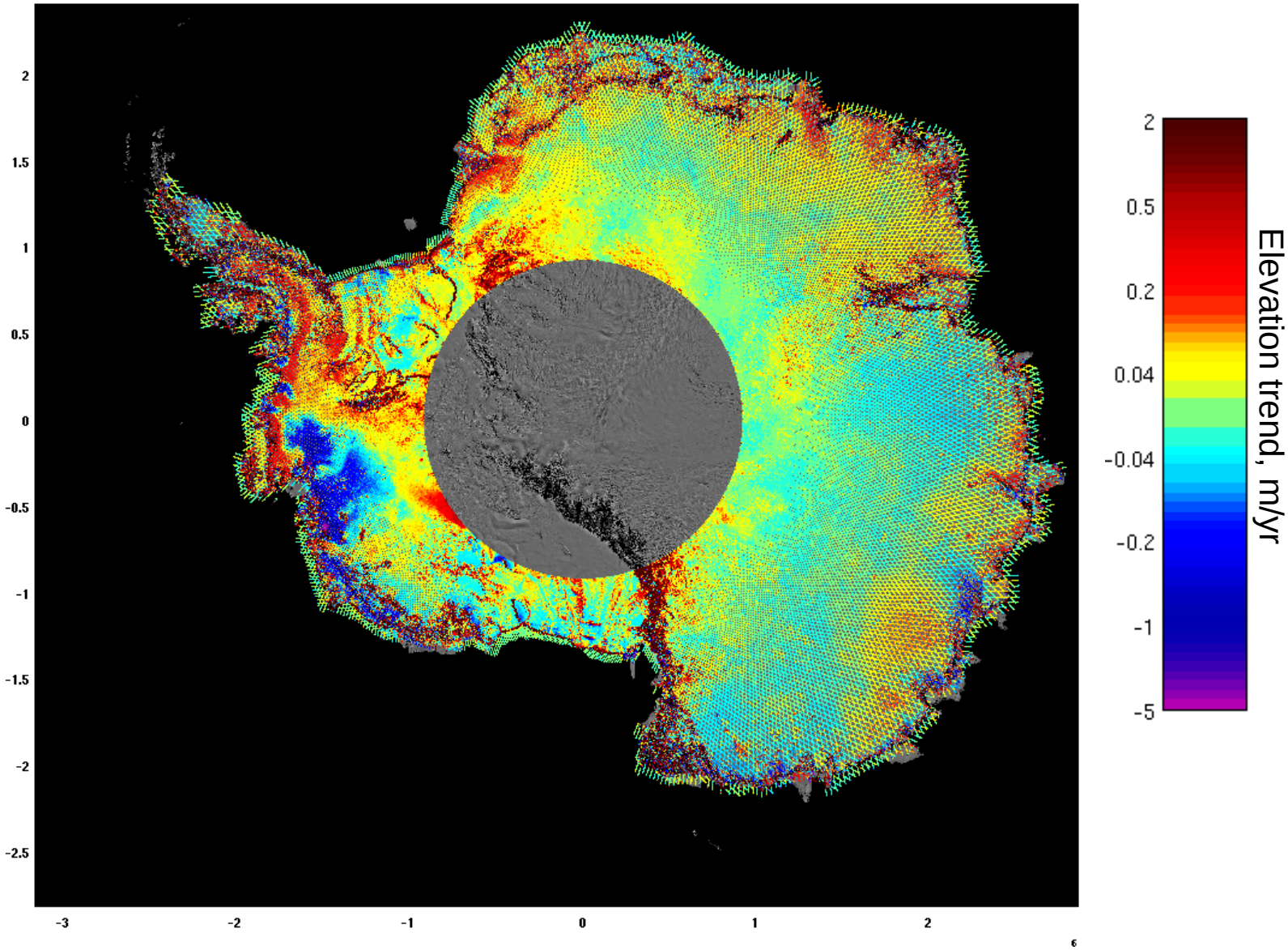
- Elevation change of the Antarctic Ice Sheet
  - Mass balance
  - Understanding processes that control the ice sheet shape
- Tool
  - Radar altimetry





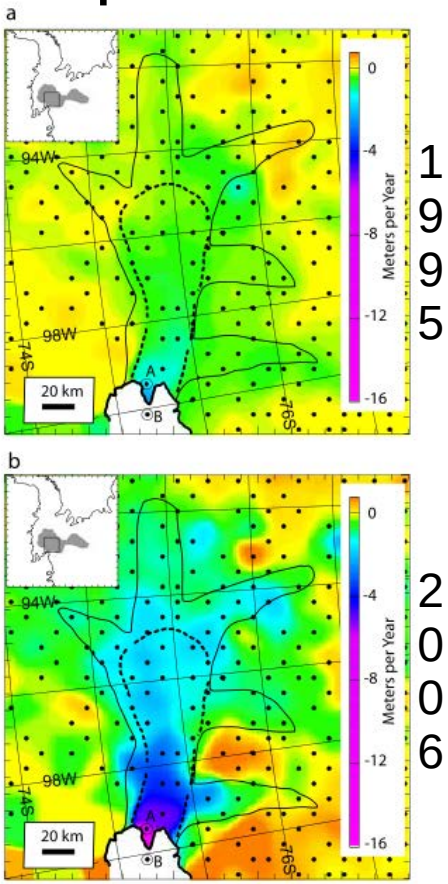


Elevation change



Along-track processing for elevation time series

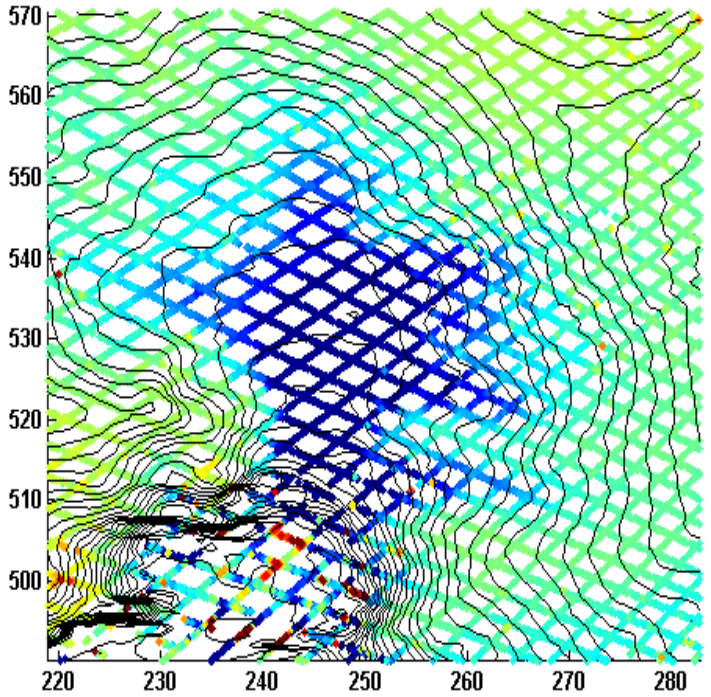
- Increased sampling : ~ 20x more measurements (compared to cross-overs)



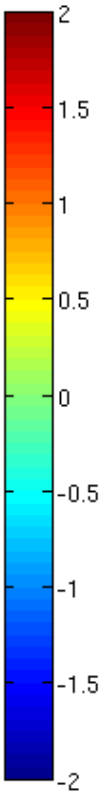
1995

2006

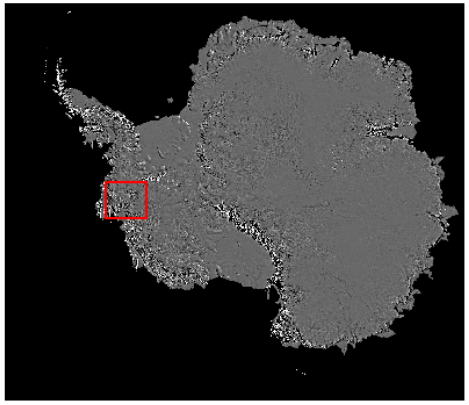
Wingham et al.,GRL,2009

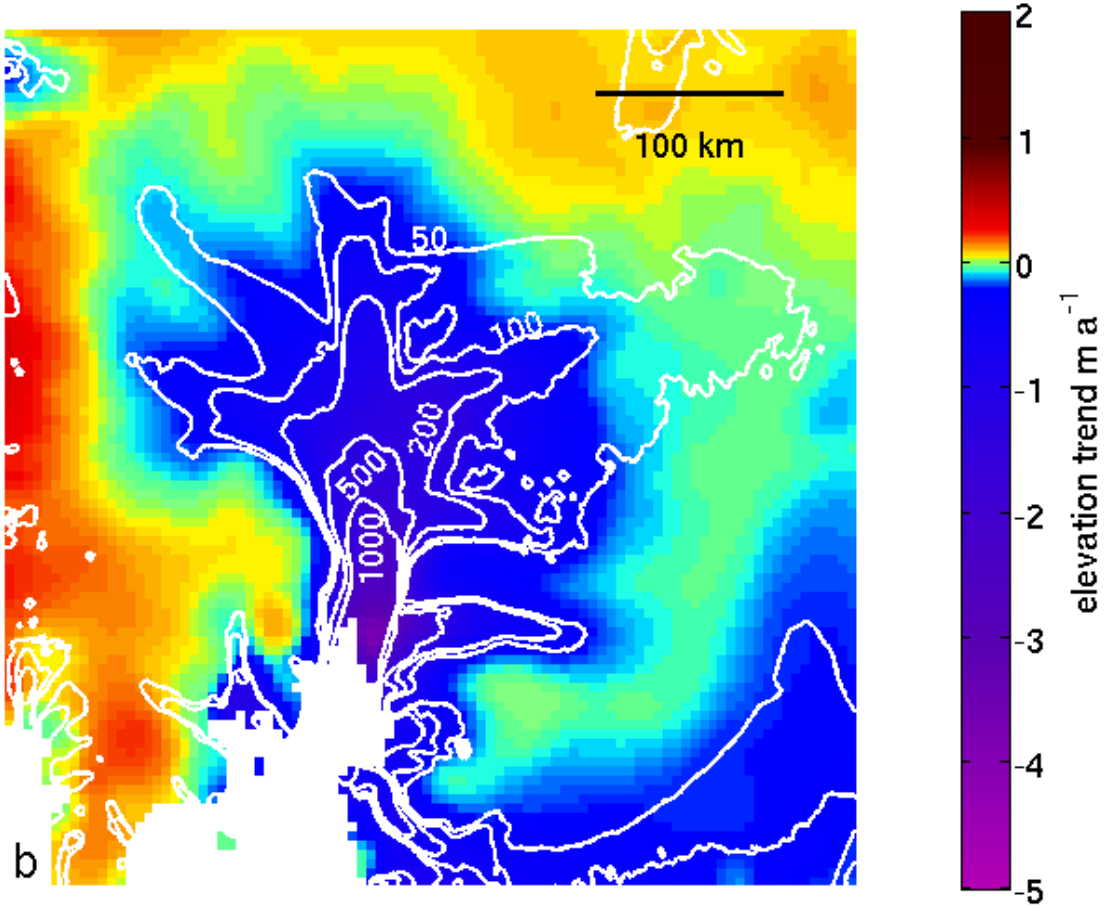


Along-track data set



Acceleration of thinning in the Amundsen Sea Sector

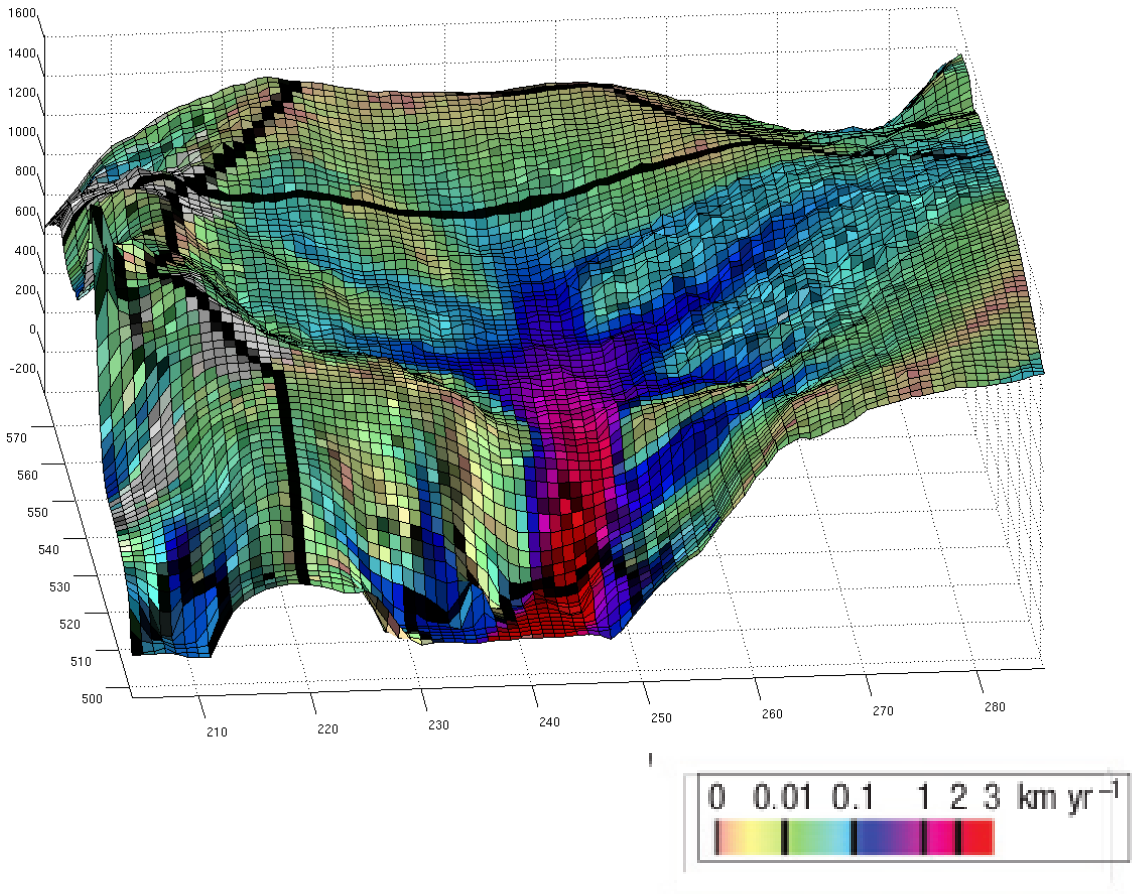




Flament and Rémy, Journal of Glaciology, 2012
Ice velocity contours from Rignot et al. 2011

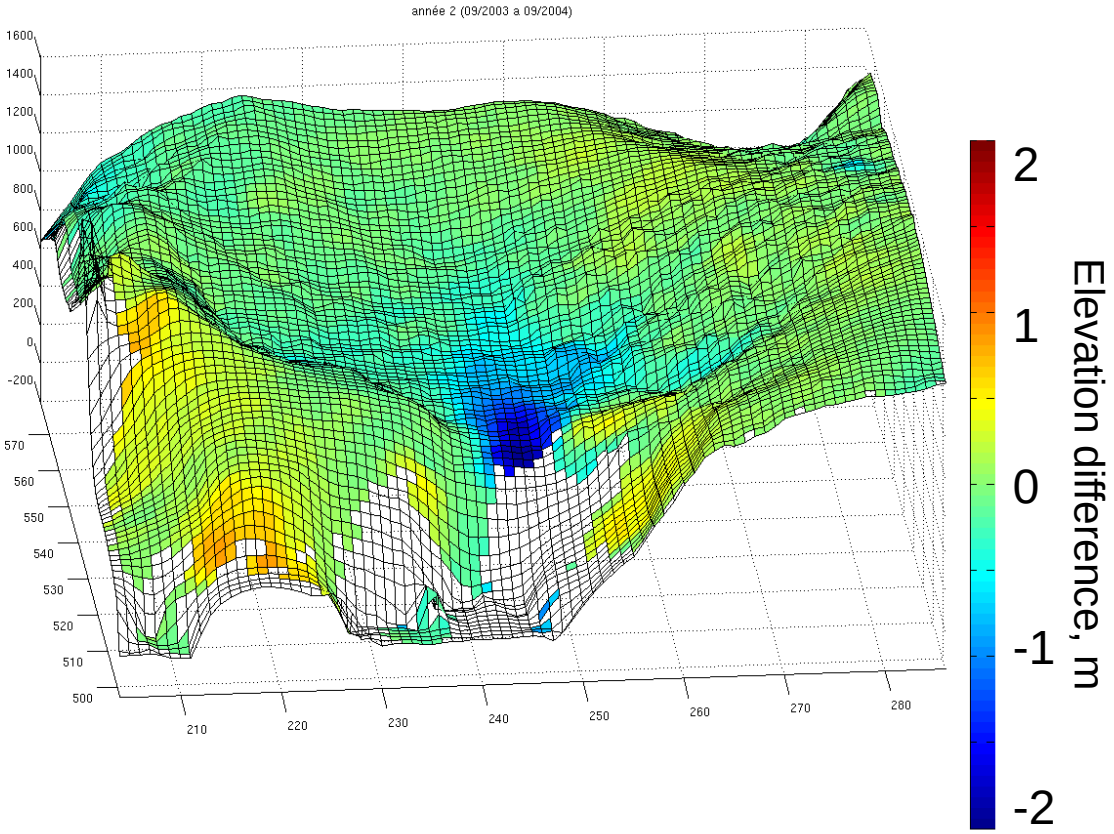
Envisat 2002-2010 elevation trend

Pine Island Glacier velocity

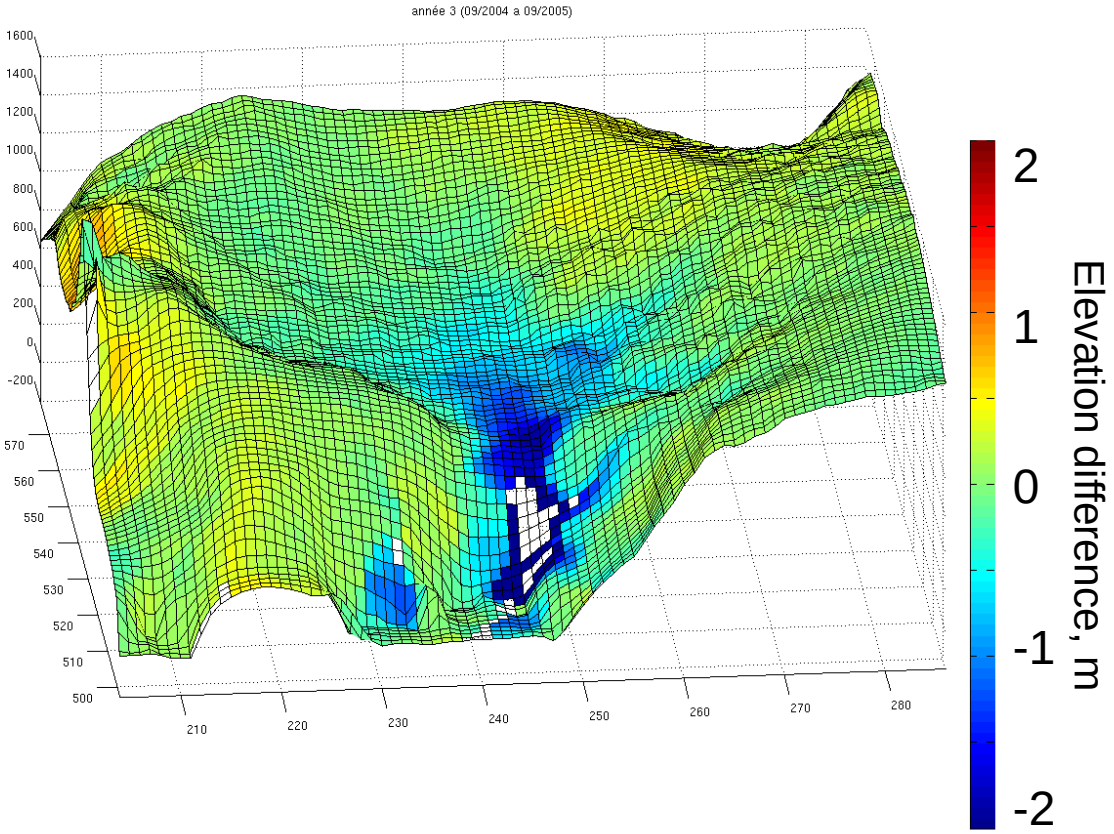


Ice velocity from Rignot et al. 2011

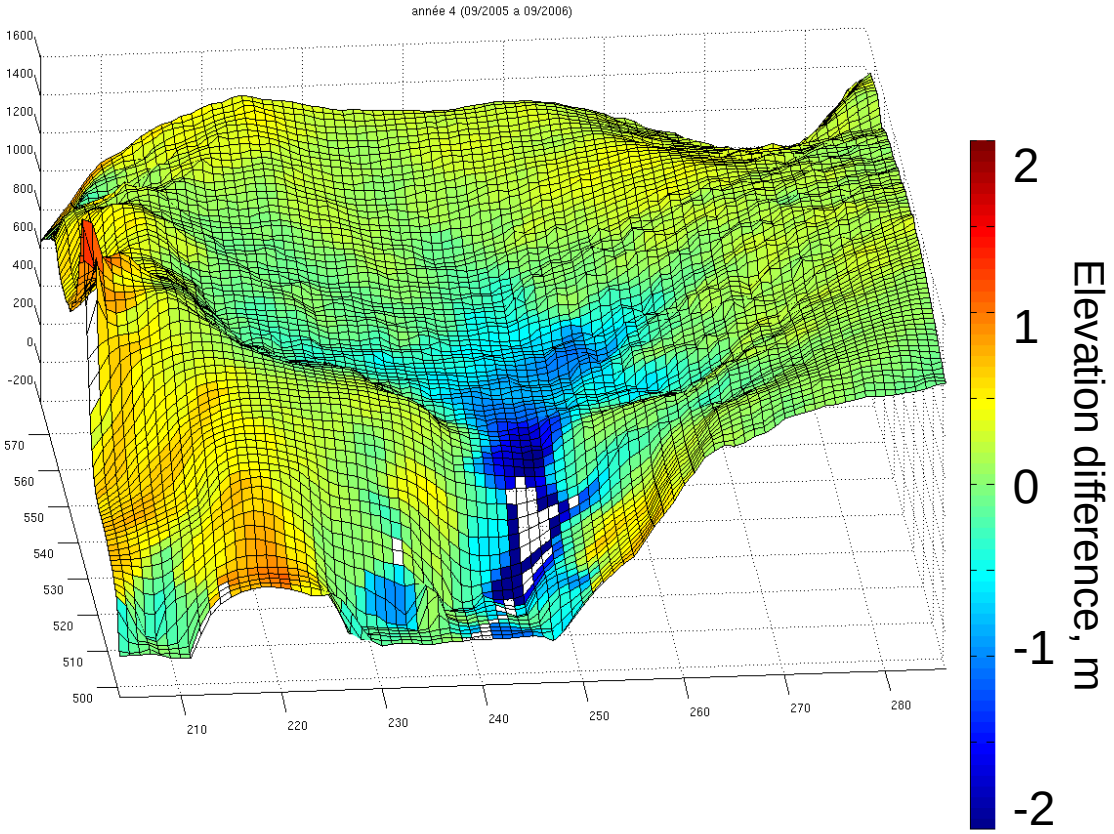
Elevation difference : 2004 minus 2003



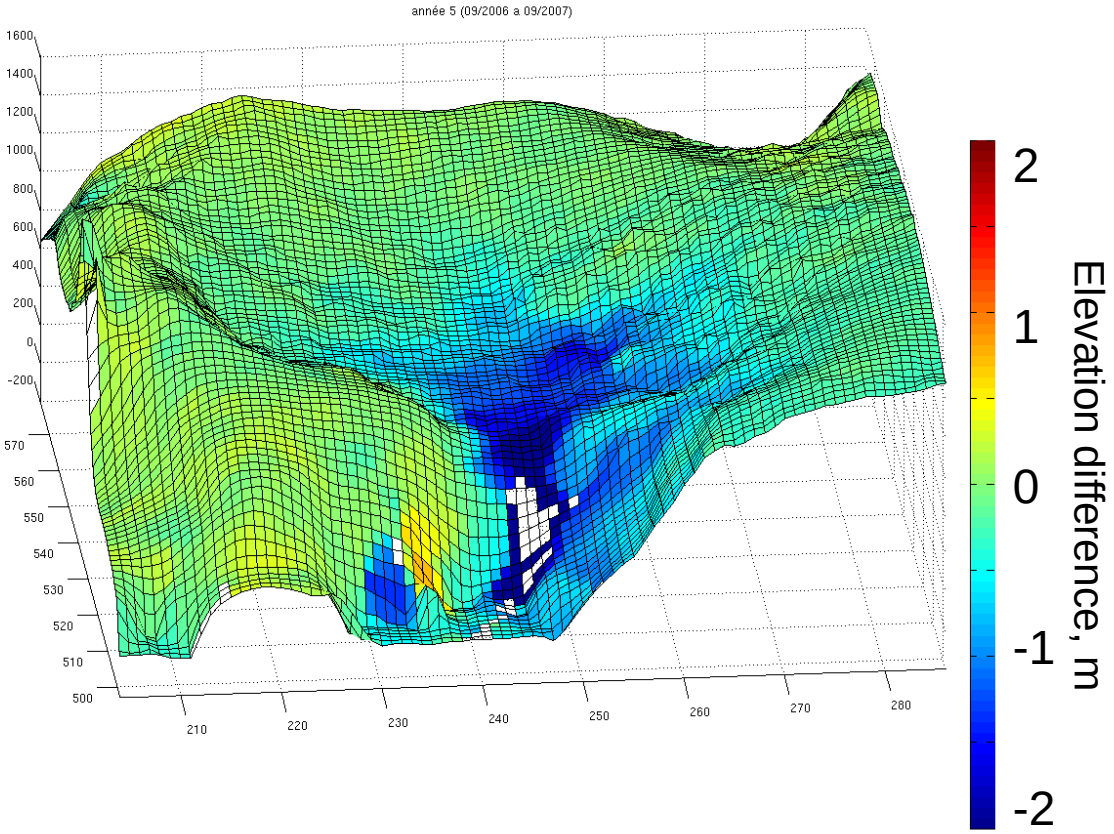
Elevation difference : 2005 minus 2004



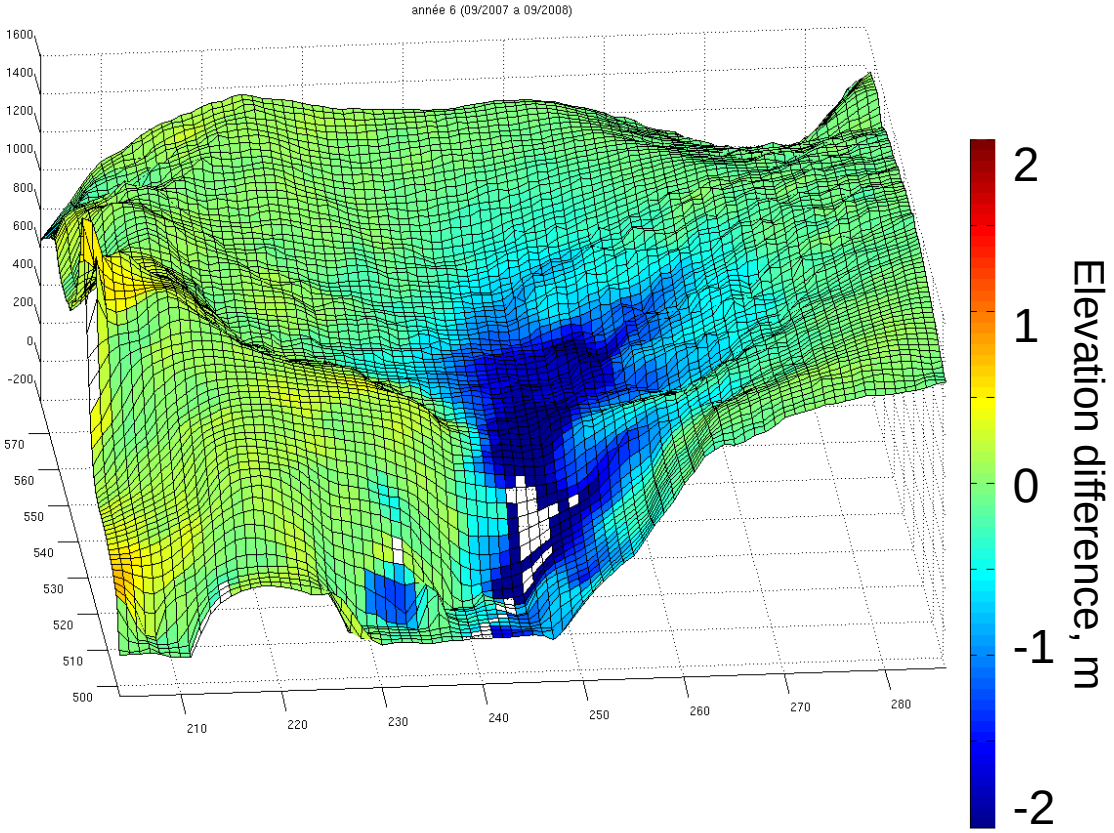
Elevation difference : 2006 minus 2005



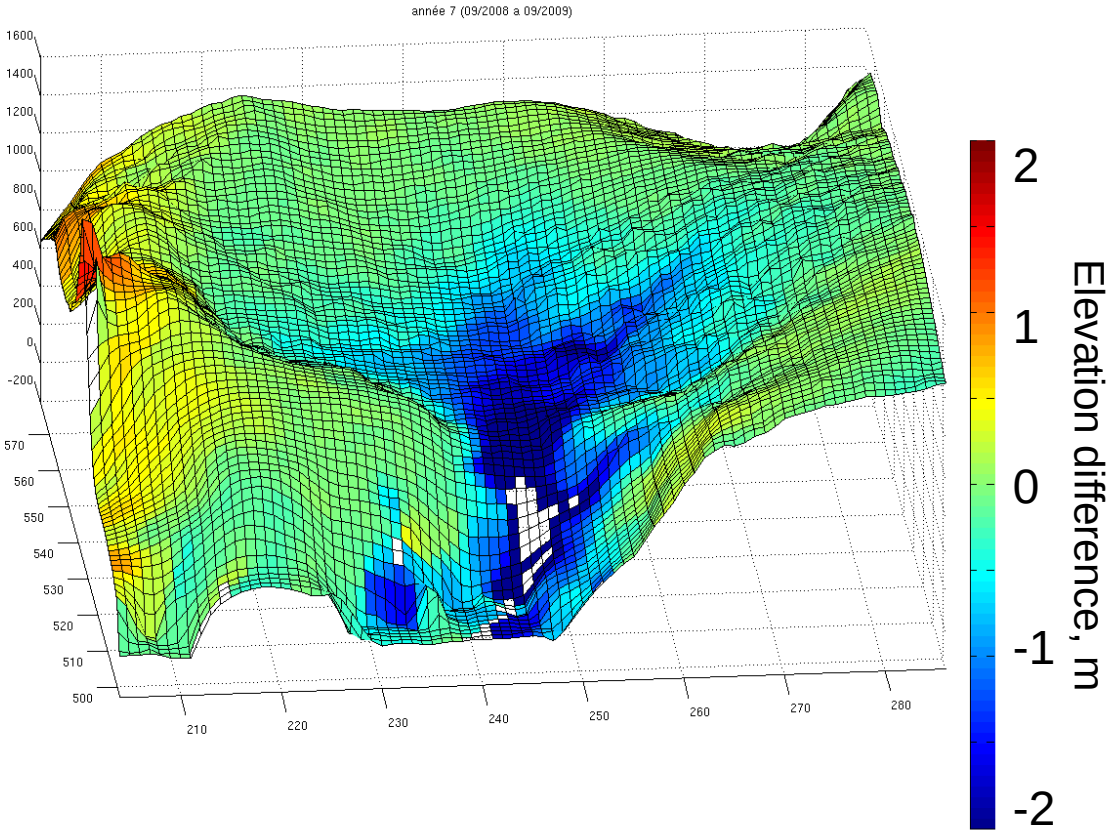
Elevation difference : 2007 minus 2006



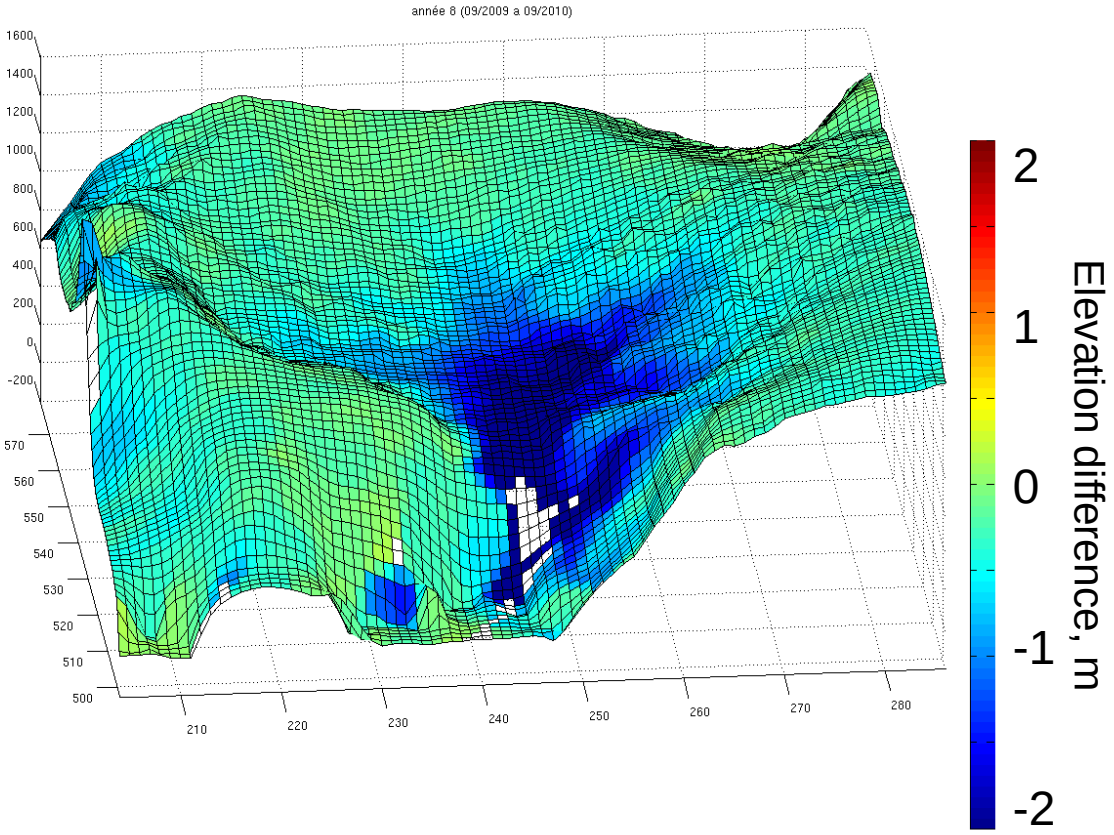
Elevation difference : 2008 minus 2007



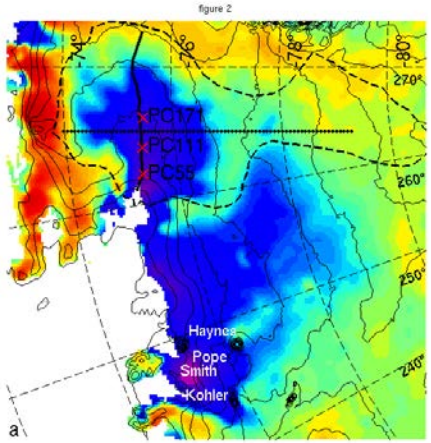
Elevation difference : 2009 minus 2008

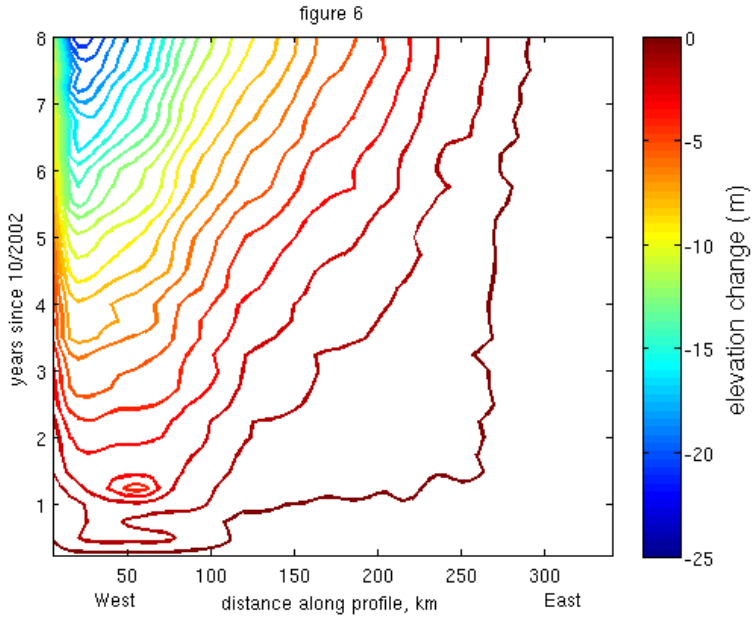


Elevation difference : 2010 minus 2009



Dynamic evolution from surface elevation



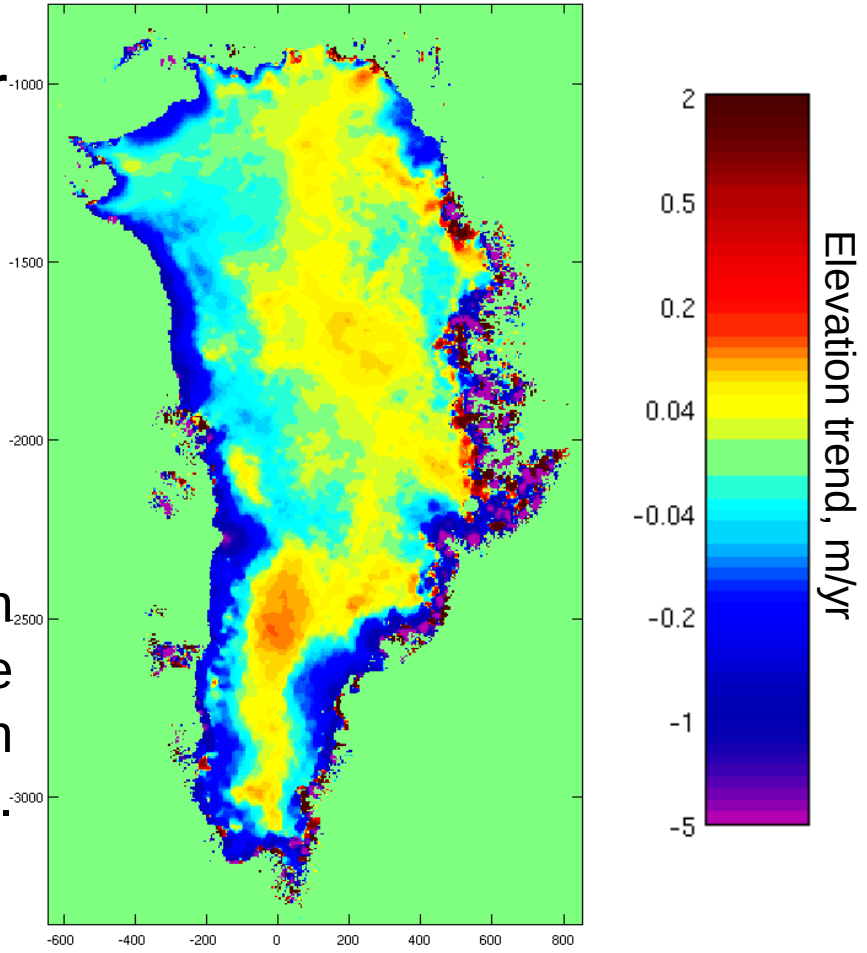


Elevation change vs time and distance along profile

Flament and Rémy, Journal of Glaciology, 2012

Greenland elevation change

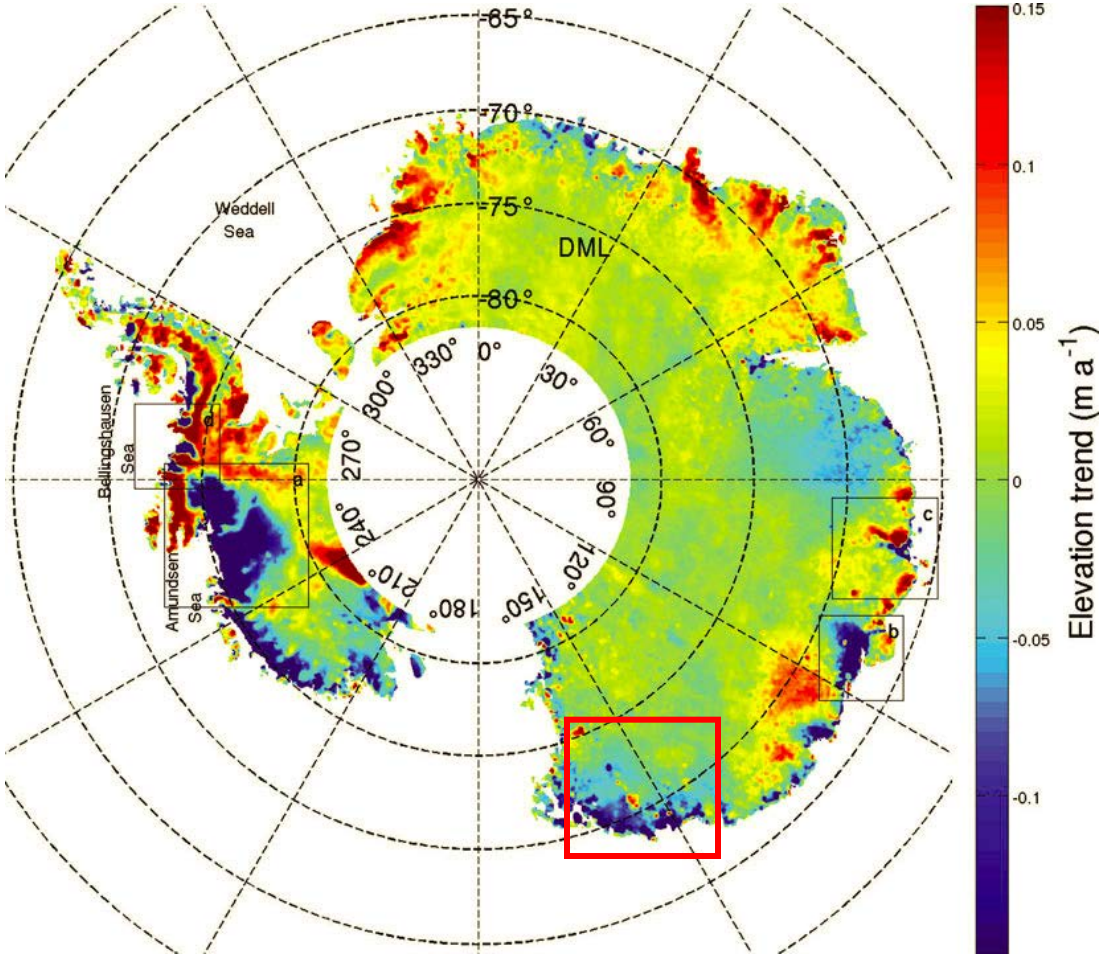
- ESA Ice Sheet CCI : same processing over Greenland.



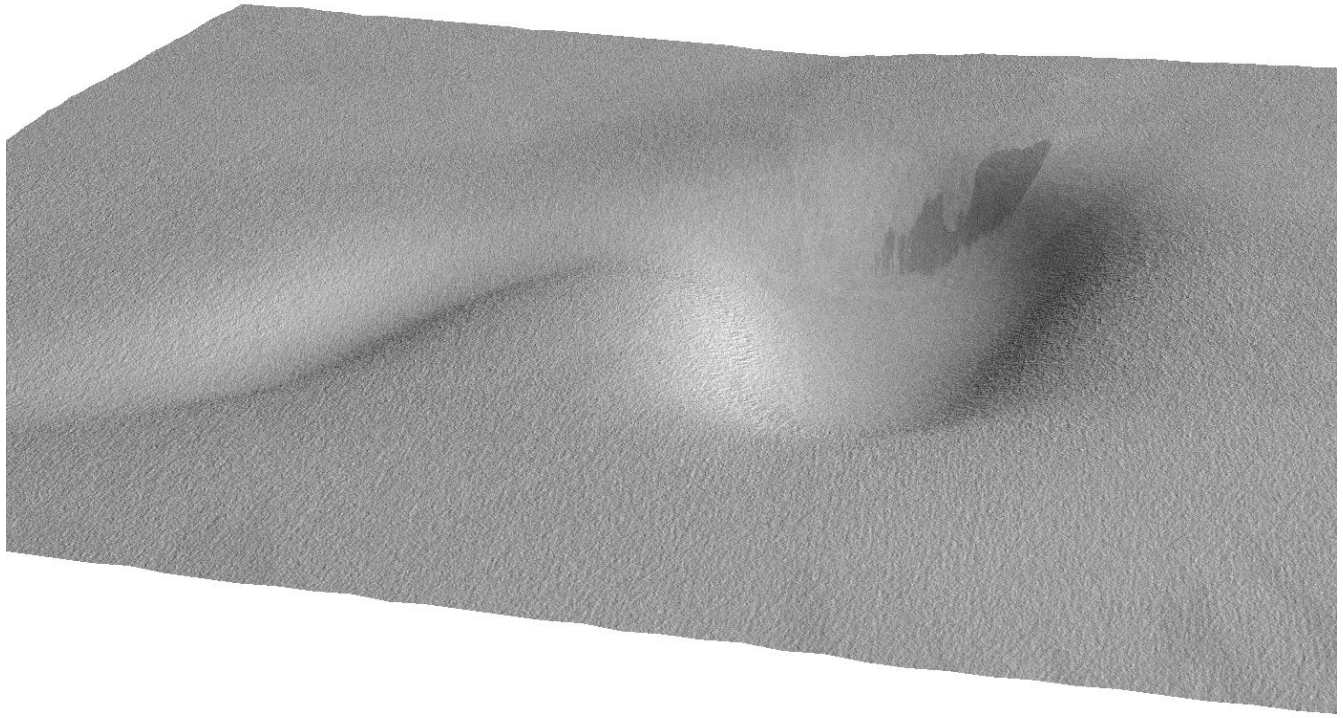
Greenland elevation change, 2002-2010, (above the 1000 m elevation contour only).

Unpublished results

Subglacial lake drainage



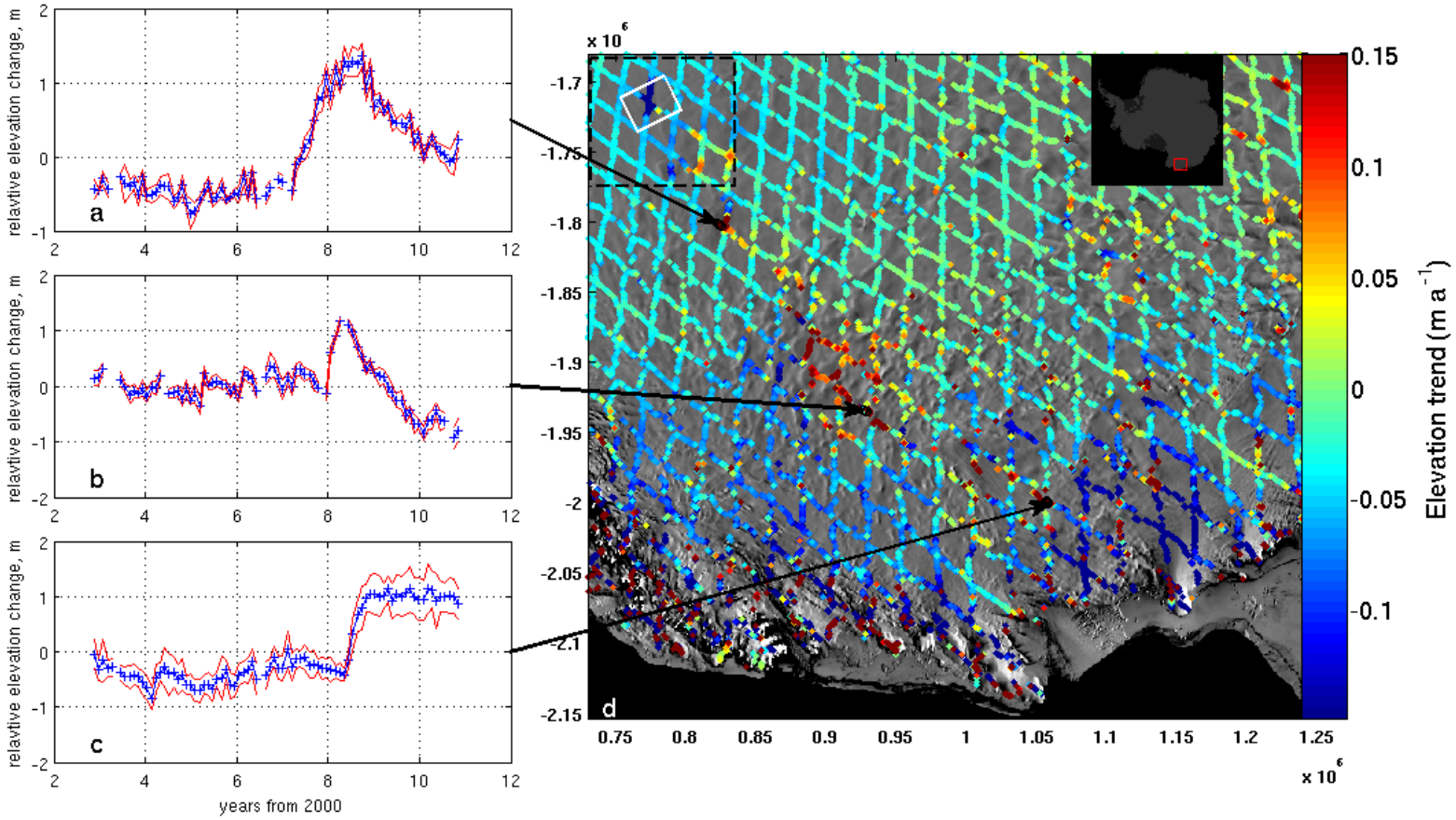
Subglacial lake drainage



SPOT 5 image and DEM of the trough left
by the drainage of lake Cook E2
(vertical scale x50)

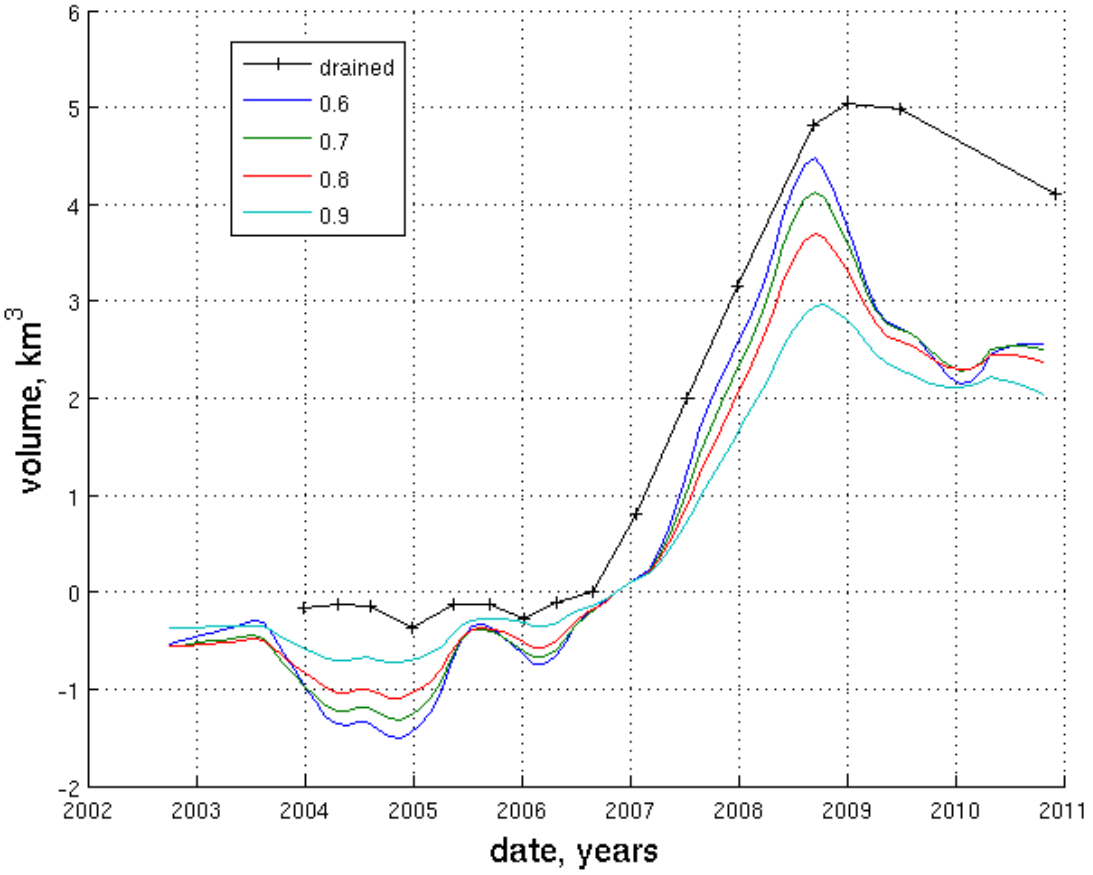
Image : E. Berthier

Subglacial lake drainage



Flament et al., submitted to TC

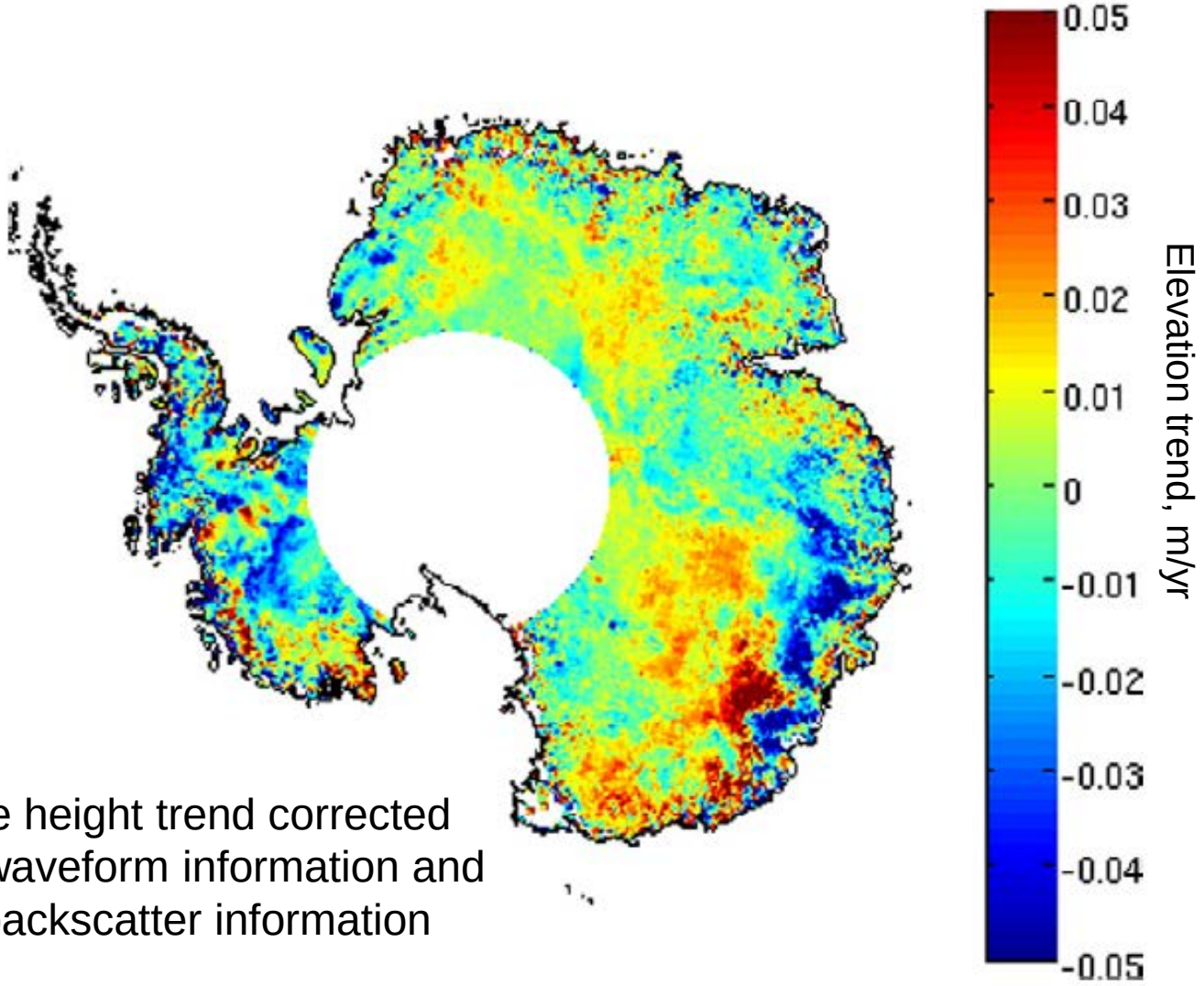
Subglacial lake drainage



Chronology of the drainage of Lake CookE2 and the subsequent storage/release of water in downstream lakes

Flament et al., submitted to TC

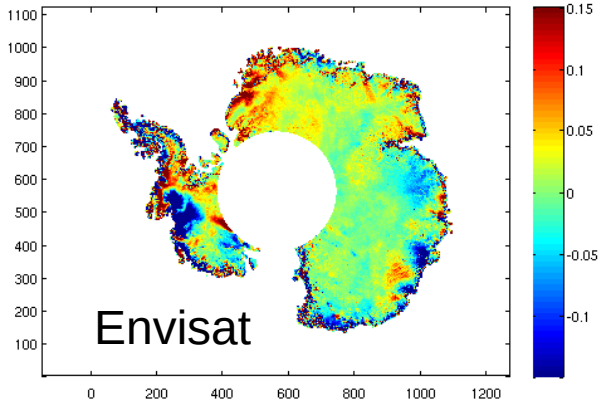
Uncertainty quantification

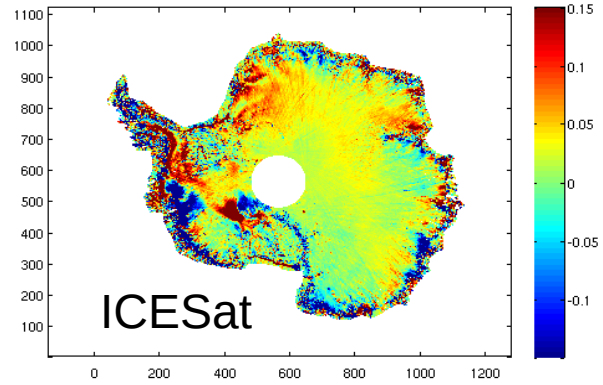


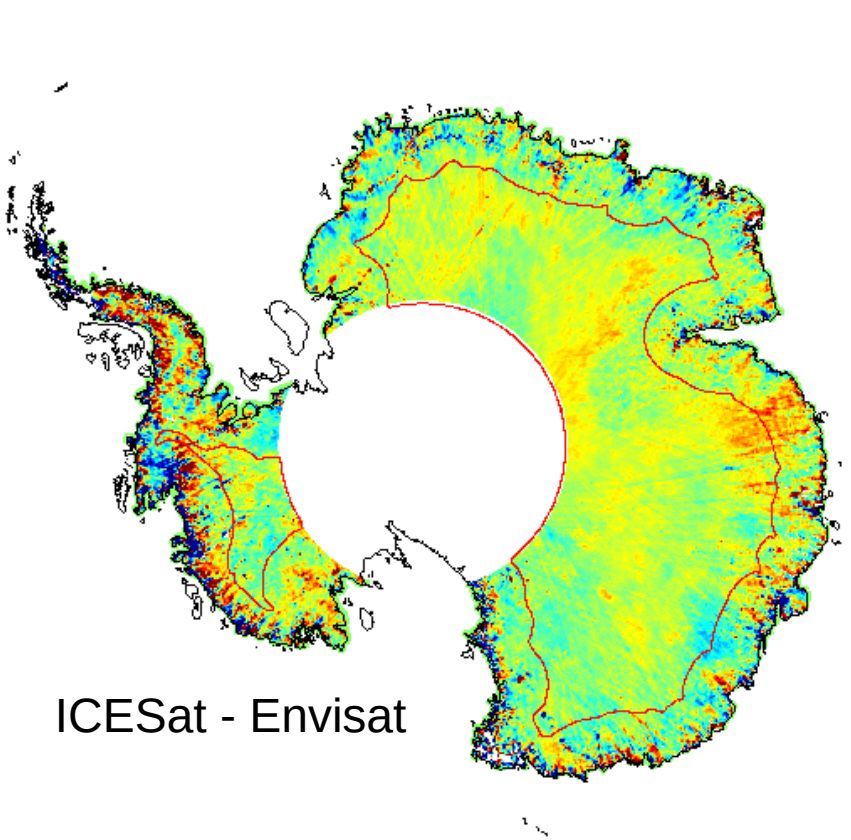
- Difference of the height trend corrected with the whole waveform information and with solely the backscatter information

Rémy, Flament et al., 2012

Uncertainty quantification





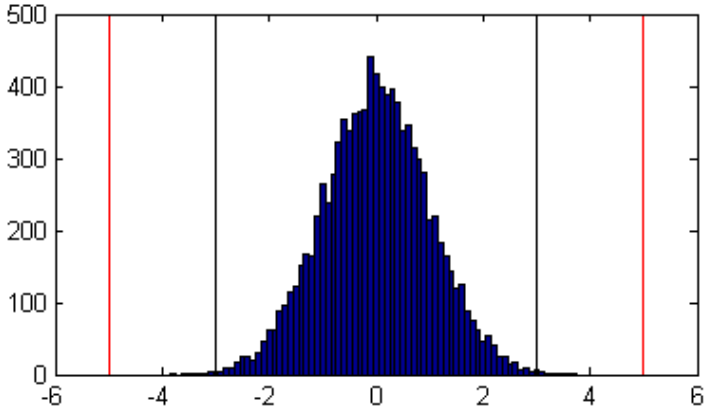


Volume trend difference within the red contour: ~70 km^3/yr
i.e. area of 4.5 10^6 km^2 ->**average difference is 1.55 cm/yr**.

Flament et al., In prep

Uncertainty quantification

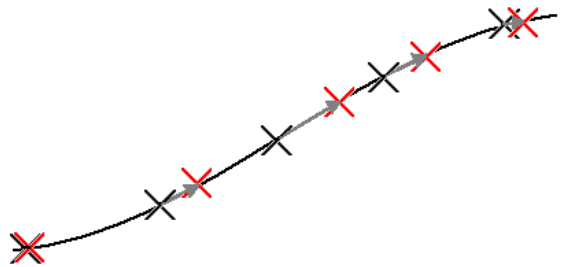
3-sigma
5-sigma



Outlier elimination

Minimum of 130 “raw measurements”
Less than 5m rmse after processing

Preselection



Points at nadir

Relocated points (at estimated Point Of Closest Approach)

Shift

Relocation

Flament et al., In prep

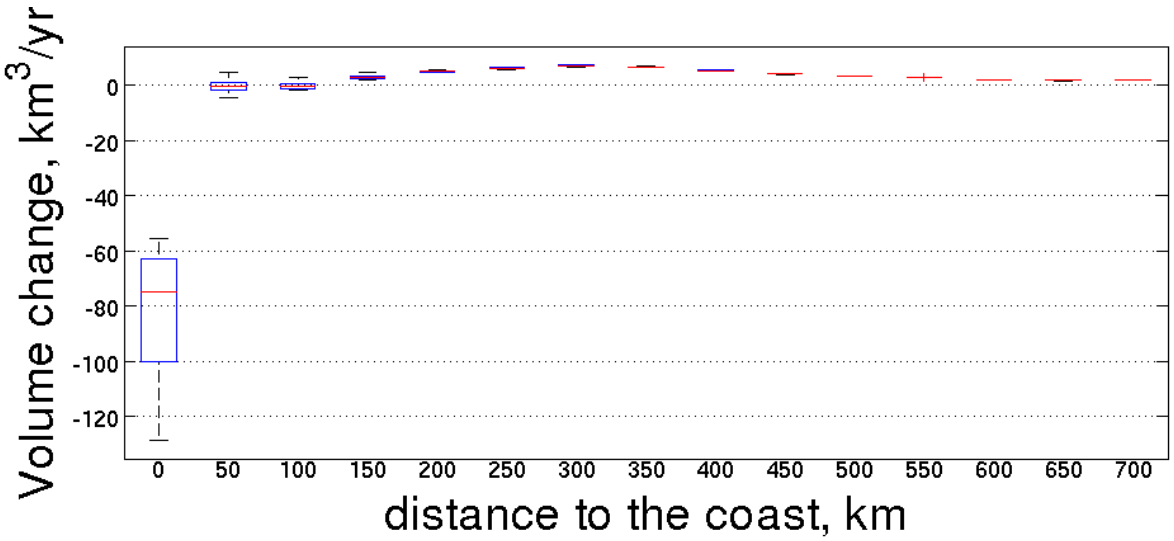
Uncertainty quantification

Rejection crit.	3-sigma			5-sigma		
Search radius, km	15	25	35	15	25	35
Basic	-78	-62	-48	-95	-84	-75
Relocated	-92	-83	-70	-113	-104	-100
Preselected	-20	-16	-10	-21	-19	-13
Reloc. & presel.	-33	-29	-20	-33	-32	-24

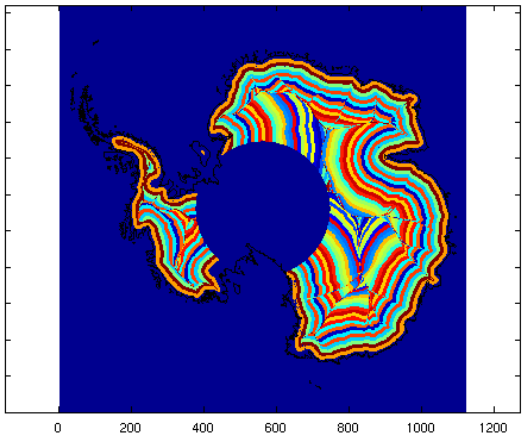
Antarctic Ice Sheet volume balance with different assumptions, km^3/yr

Flament et al., In prep

Uncertainty quantification



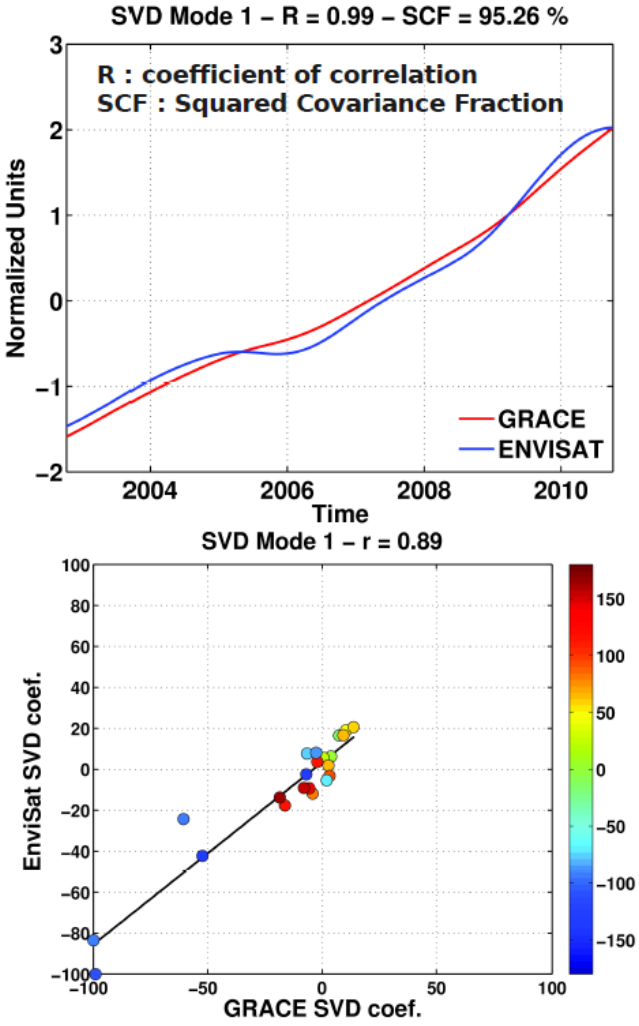
Box plot of volume change vs distance to the coast. Each distance bin is 50 km wide.

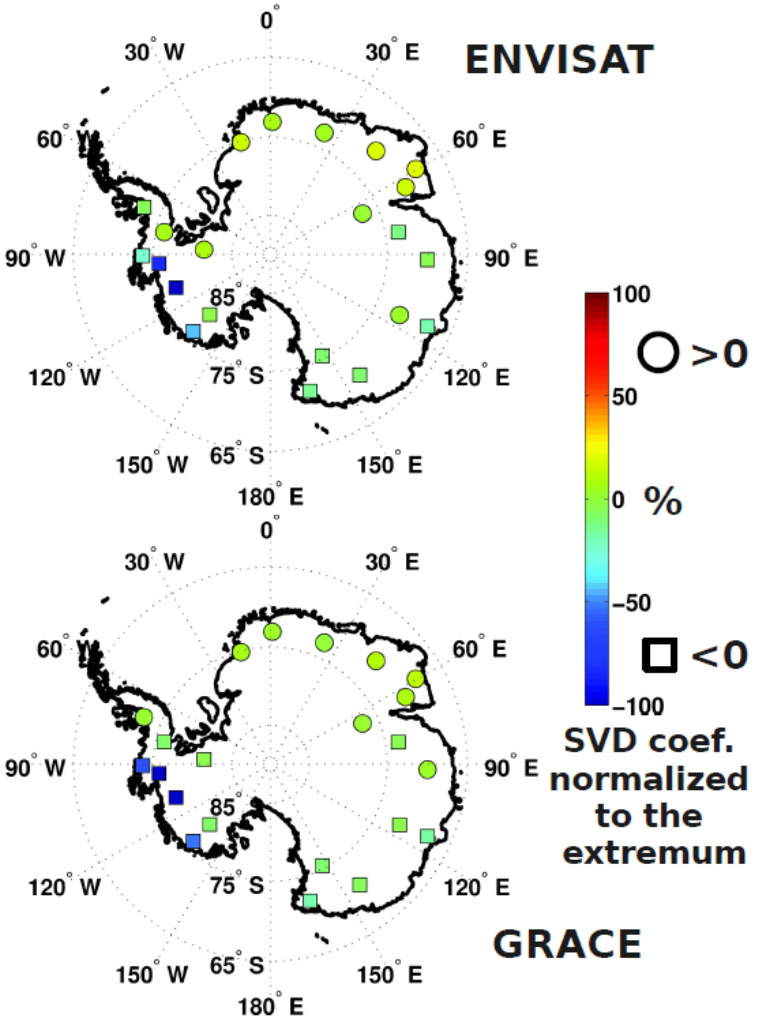


The Antarctic continent divided in 50-km-wide stripes

Flament et al., In prep

Volume to mass :Effective density



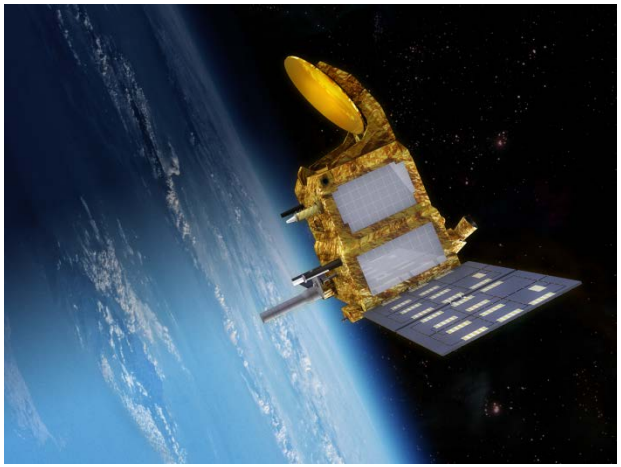


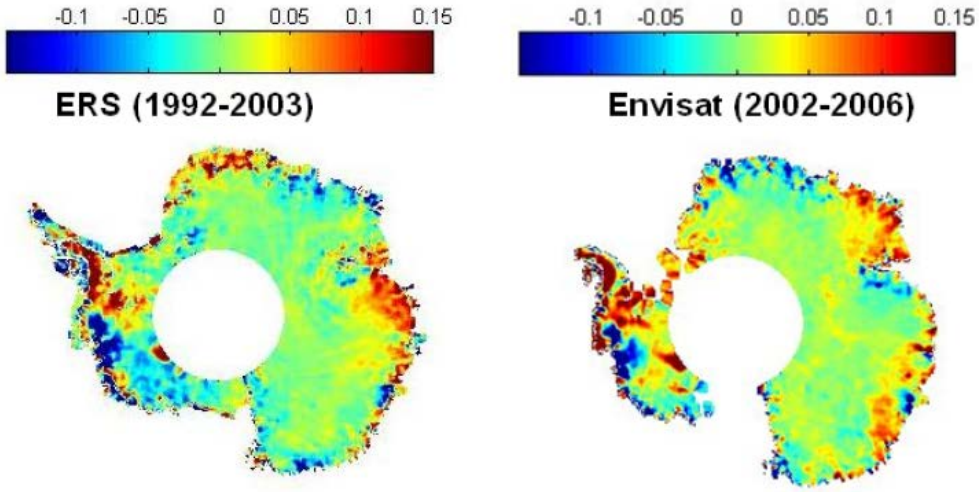
*SVD = Singular Values Decomposition

Memin, Flament et al., in prep

Longer time series

- SARAL/AltiKa, follow-on to ERS and Envisat missions





Rémy and Parouty, 2009