Geoid and Mean Sea Surface Product and impact on SLA

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- 5 presentations with 3 main subjects

- Presentation of 2 new Mean Sea Surface
  - The DTU10 mean sea surface and mean dynamic topography – Improvements in the Arctic and coastal zone O. ANDERSEN (DTU Space)
  - The new CNES/CLS 2010 mean sea surface P. SCHAEFFER (CLS)

- First results on the use of Goce data in Mean Dynamic Topography
  - Dynamic ocean topography – first estimates with GOCE gravity fieldsW. BOSCH (DGFI)
  - Oceanographic validation of the preliminary GOCE geoid model M.H. RIO / G. LARNICOL (CLS)

- Potential improvement of geoid/MSS using a geodetic mission – related to J1 end of life
  - Potential for improving global marine gravity from CRYOSAT and JASON-1 D. SANDWELL (Scripps Instit. of Oceanography) / W SMITH

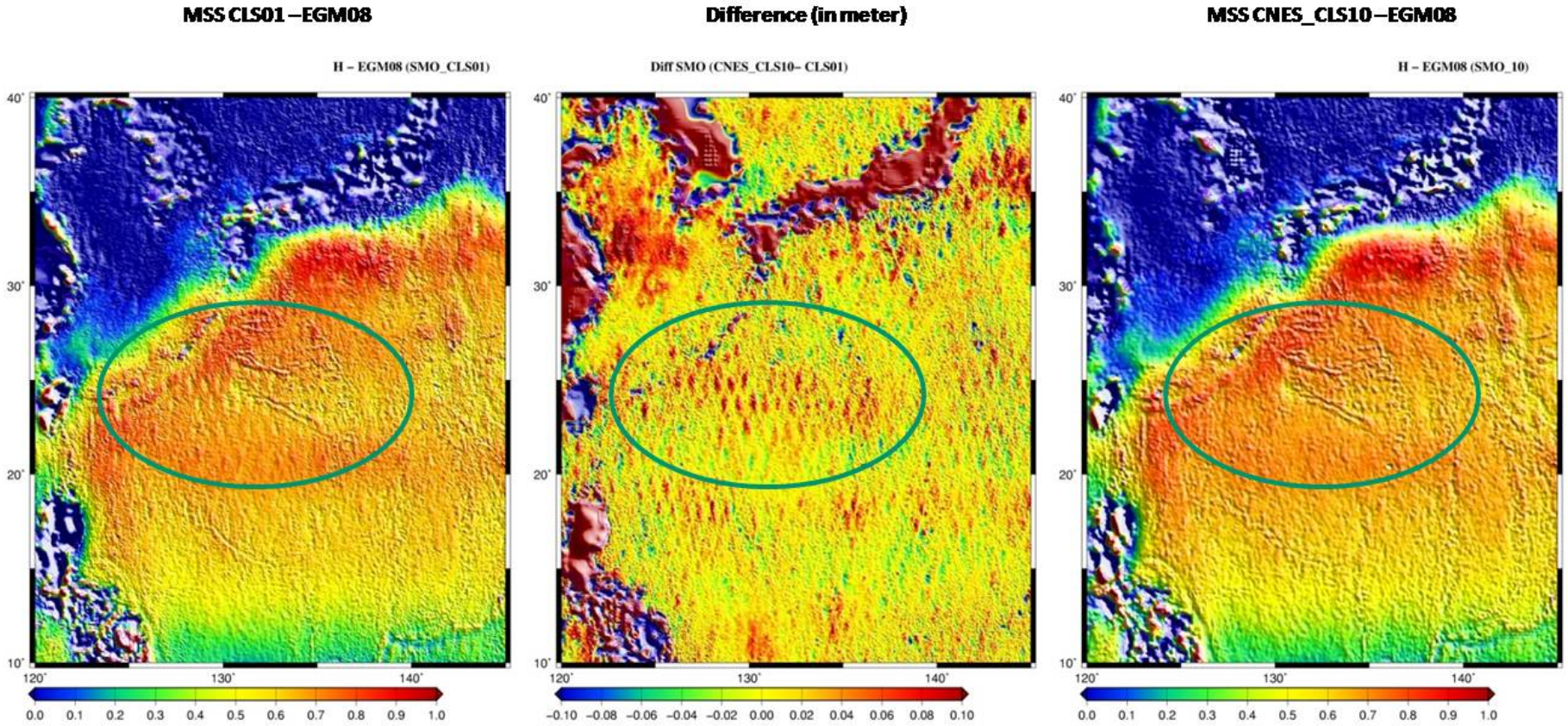
Presentation of 2 new MSS (1/4)

- 2 MSS have been released this year: CNES_CLS10 in June 2010 and DTU10

- Dramatic improvements in MSS modelling, notably
  - Extended temporal coverage
  - Resolution refinement for both MSS
  - Ocean variability: it is important to remove properly the ocean variability (noise for MSS) for geodetic data but also for mean profiles. : extensive work has been performed in CLSCNES10 to optimally remove the ocean variability
  - Strong improvement near the coast and Polar region. DTU10 uses ERS-1 retrack data and Icesat data to improve this regions

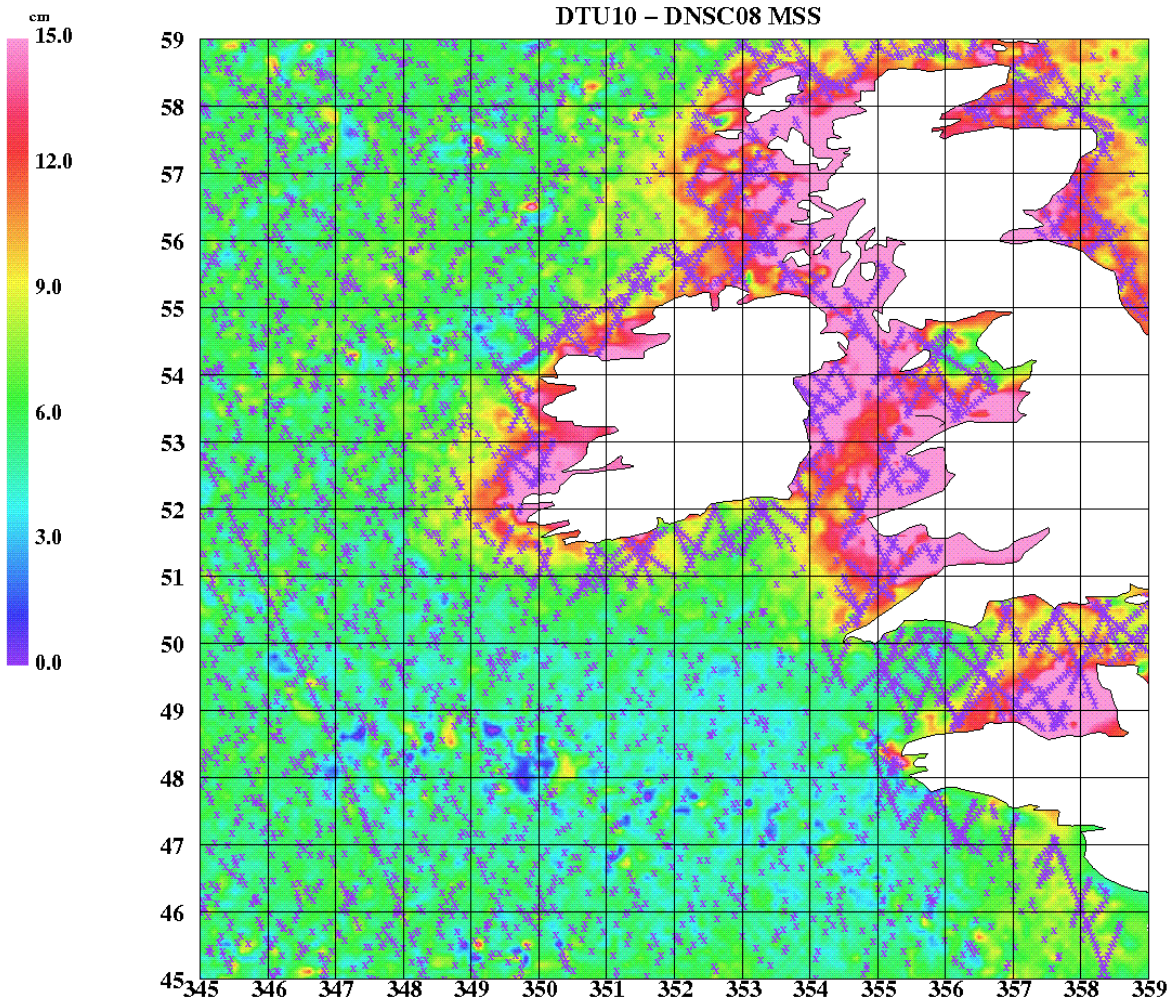
Presentation of 2 new MSS (2/4)

Improving removing of oceanic variability, exemple in the Kuroshio region



Presentation of 2 new MSS (3/4)

Improvement of DTU10, example around the England coast



Presentation of 2 new MSS (4/4)

- Intercomparison very interesting:.
  - Shows the strength an weakness of each of MSS.
  - Collaboration should continue between MSS development team in order to help us on MSS error characterization

- BUT: it is important to perform comparisons of MSS on a common reference period, otherwise the difference is dominated by interannual varibility

- New release of CNESCLS will be deliver in coming month to correct from the problem highlighted

- There are good perspectives for MSS improvement in the coming year:
  - New track explored: Envisat new ground track, Cryosat ,HY2
  - Reprocessing of products from old and current missions

- This improvement is crucial for satellite outside from the historical track
  - will enhance Envisat new phase and Cryosat themselves
  - Allows us to be prepared in case of a change of orbit of J1 or Jason-CS

First results on the use of Goce data in MDT (1/2)

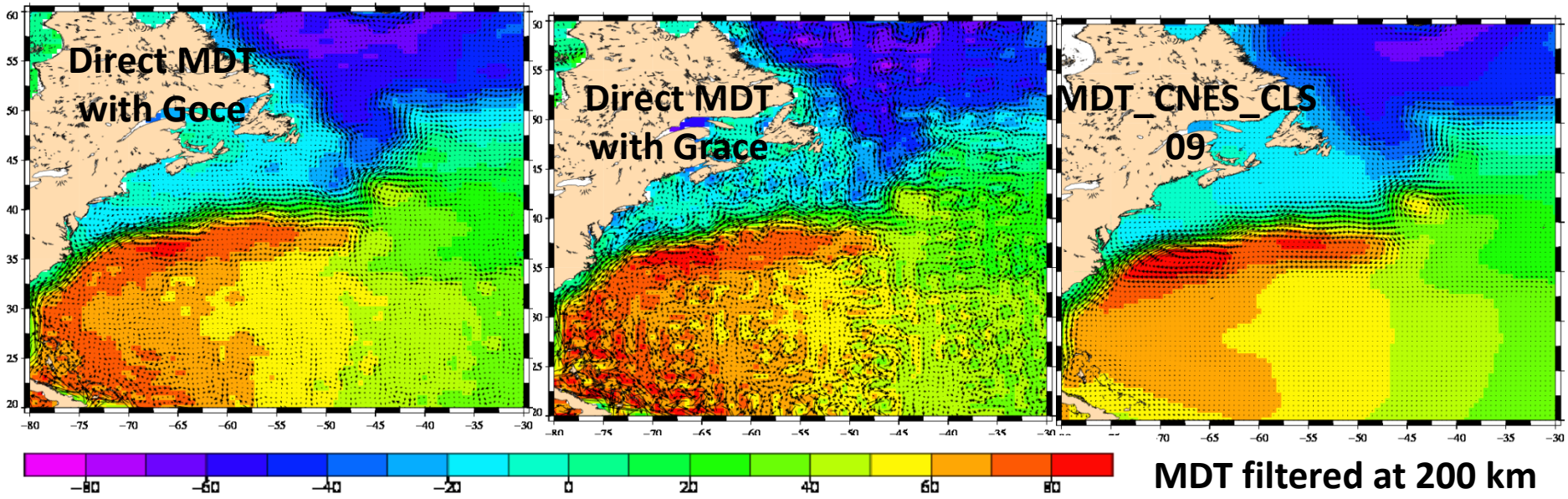
•Exciting and promising results obtained with the preleminary Goce Geoid (71 days of data)

•Application of the Direct method (developped by DGFI) to Goce data in order to obtain absolute dynamic topography

•Quantitative assessment of direct MDT (MSS-Geoid) obtained with Goce data

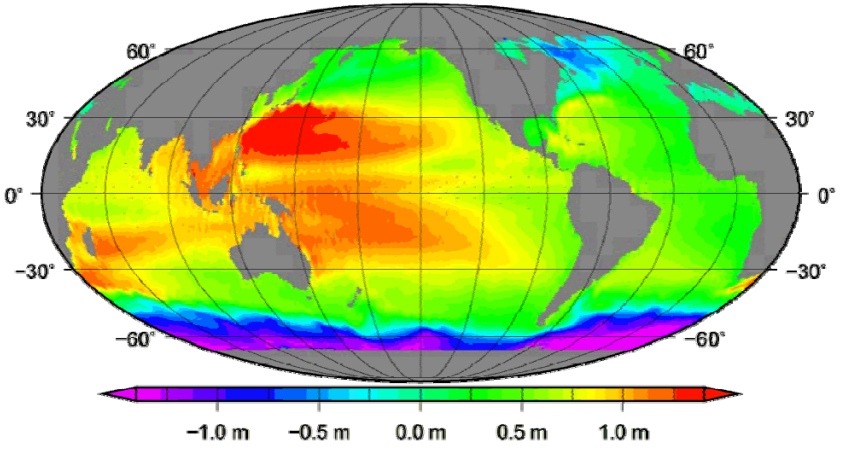
•Expecting the next release of Goce for further results

First results on the use of Goce data in MDT (2/2)



MDT filtered at 200 km (cm) from Rio et al

Mean GOCE DOTs (D=121km/L=120) from DGFI et al



Potential improvement of geoid/MSS using a geodetic mission

- Debate on the choice between geodetic vs interleaved orbit

- Big interest for a Jason-1 geodetic mission. For both MSS and geoid improvement
  - Higher quality compared to older GM missions (double PRF, lower noise)
  - Inclination: Jason-1 ‘s inclination is fundamental for the geoid modeling (Cryosat’s inclination is 98°).
  - 1 year of Jason-1 GM would improve MSS + Geoid determination and possible uncover > 50000 unknown seamounts
  - Would benefit future satellite missions (like Jason CS with new orbits)
  - Recommendation: A possible GM configuration (320-400 days) will result in 10 km track resolution – so two interlaced repeats are required (5 km)

- But it will degrade the SLA restitution (important to oceanographers). By how much?
  - Recent MSS error study should be carefully re-analysed with new CLS10 : First results show that the problem found on MSS CNES-CLS10 does not impact the global performance estimations (local impact only)
  - Several presentations demonstrated the MSS error is 3 -5 between historical tracks
  - Recommendation initiate exercise of “Envisat new ground track” assimilation in model to validate if data on new tracks are adequate enough for oceanography