



Altimetry Data Distributed by CTOH

Center of Topography of Oceans and Hydrospher

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Established in 1989, the Centre for Topographic studies of the Oceans and Hydrosphere (CTOH) is a French national observational service dedicated to satellite altimetry studies. The principal objective of the CTOH is to develop and maintain altimetric data bases with homogeneous, up-to-date corrections for the long term monitoring of sea level, lake and river levels, and the cryosphere for climate studies. The CTOH aides scientific users in the development of new altimetric products and applications.

Along-Track Data : GDR + Added Corrections

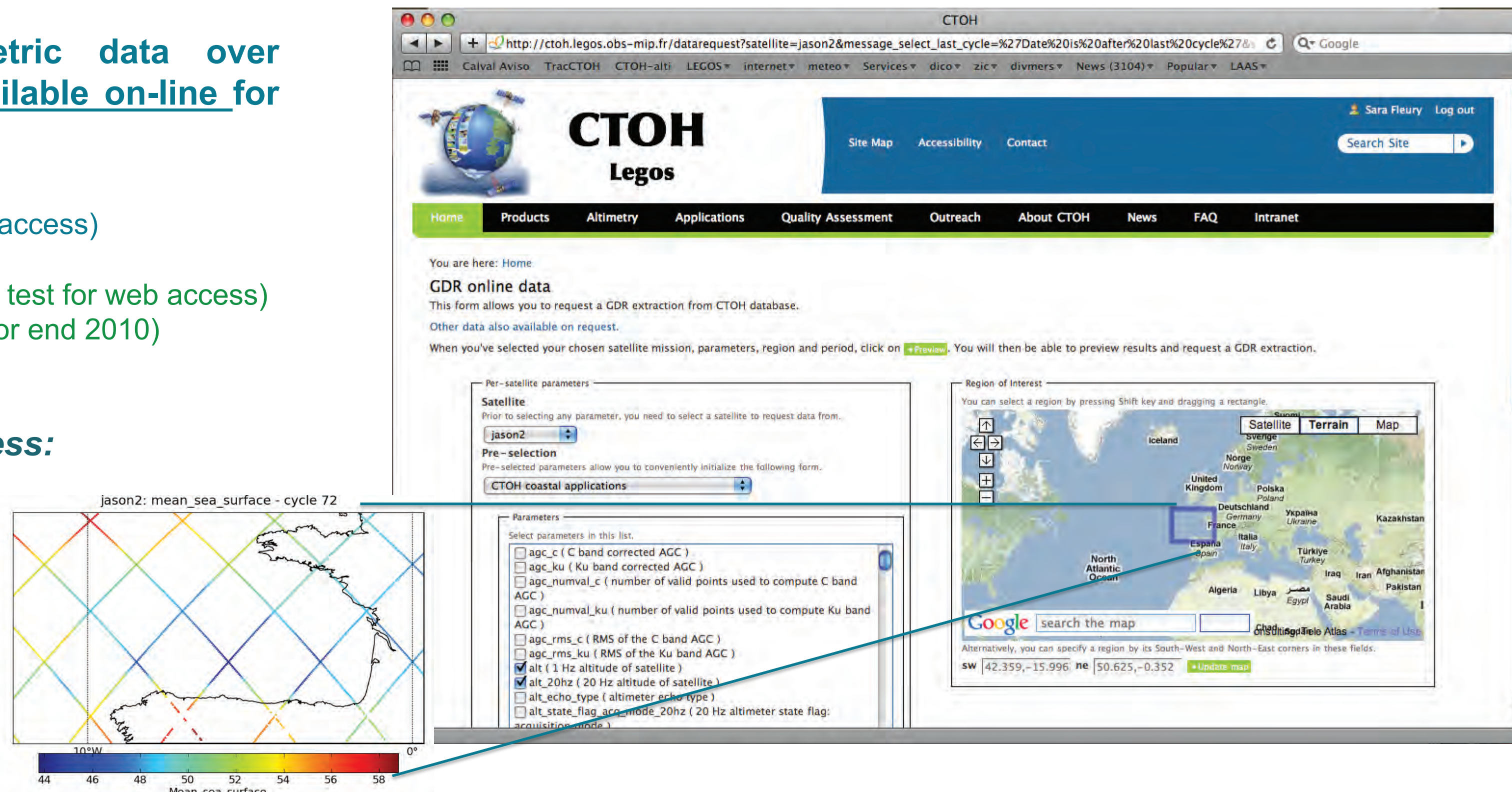
<http://ctoh.legos.obs-mip.fr/products/alongtrack-data>

Alongtrack GDR altimetric data over oceans & continents available on-line for following missions :

- Jason 1 (direct web access)
- Jason 1 New Orbit (direct web access)
- Jason 2 (direct web access)
- Envisat (via mail request - beta test for web access)
- Topex (via mail request - web for end 2010)

New interactive web access:

- Online visualisation
- Interactive data access
- Netcdf files format
- OpenDAP (end 2010)



Correction added to GDR by CTOH (newly added corrections in blue)

- GIM ionospheric correction
- Wet Tropo CLS 01 – continental surfaces
- Coastal Wet Tropo (S. Brown 2010 – jason2)
- GOT00 / FES04 / GOT47 tide models
- Invert barometer ECMWF / MOG2D
- Mean Dynamic Topo MDT (RIO05 / RIO09)
- Mean Sea Surface (CLS_01 / CNES_CLS_2010)
- Geoids (GGM02 EGM2008, GOCE2010)
- Bathymetry (Gridone)
- Distance to nearest coast (Leuliette / Stump)

Upcoming corrections

- Coastal Wet Tropo (S. Brown 2010 - jason1)
- New orbits
- Others MSS

Also, we can easily interpolate, add and redistribute any gridded data correction into along-track GDRs. Contact us.

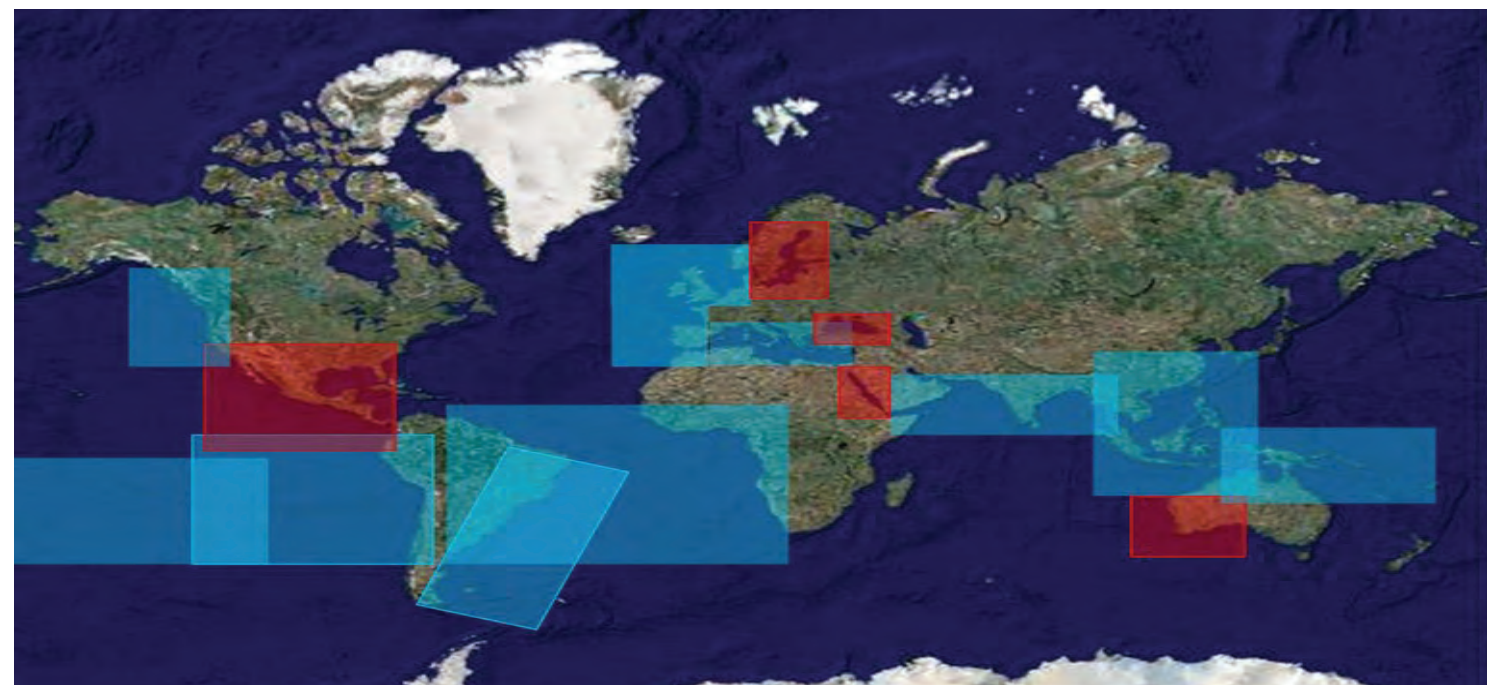
Coastal Products

<http://ctoh.legos.obs-mip.fr/products/coastal-products>

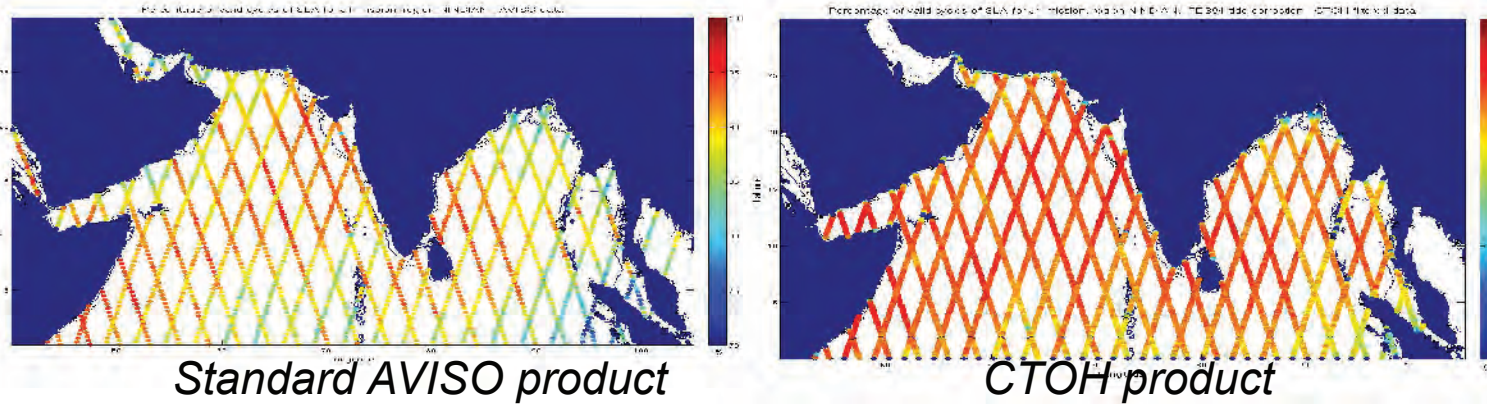
Along-Track SLA 1hz (T/P, J2, J1, Envisat, GFO)

CTOH along-track sea level anomalies are computed for each altimetry mission (Topex/Poseidon TP, Jason-1, Geosat Follow On – GFO, and Envisat), using the Sea Surface Heights (SSH) provided by the X-TRACK coastal processing tool, and the latest corrections available in the CTOH database. The data are projected onto a nominal track with a spatial interval of about 7 km between points (1 second).

Available zones (blue: validated ; red: under validation)



Improved percentage of data available :



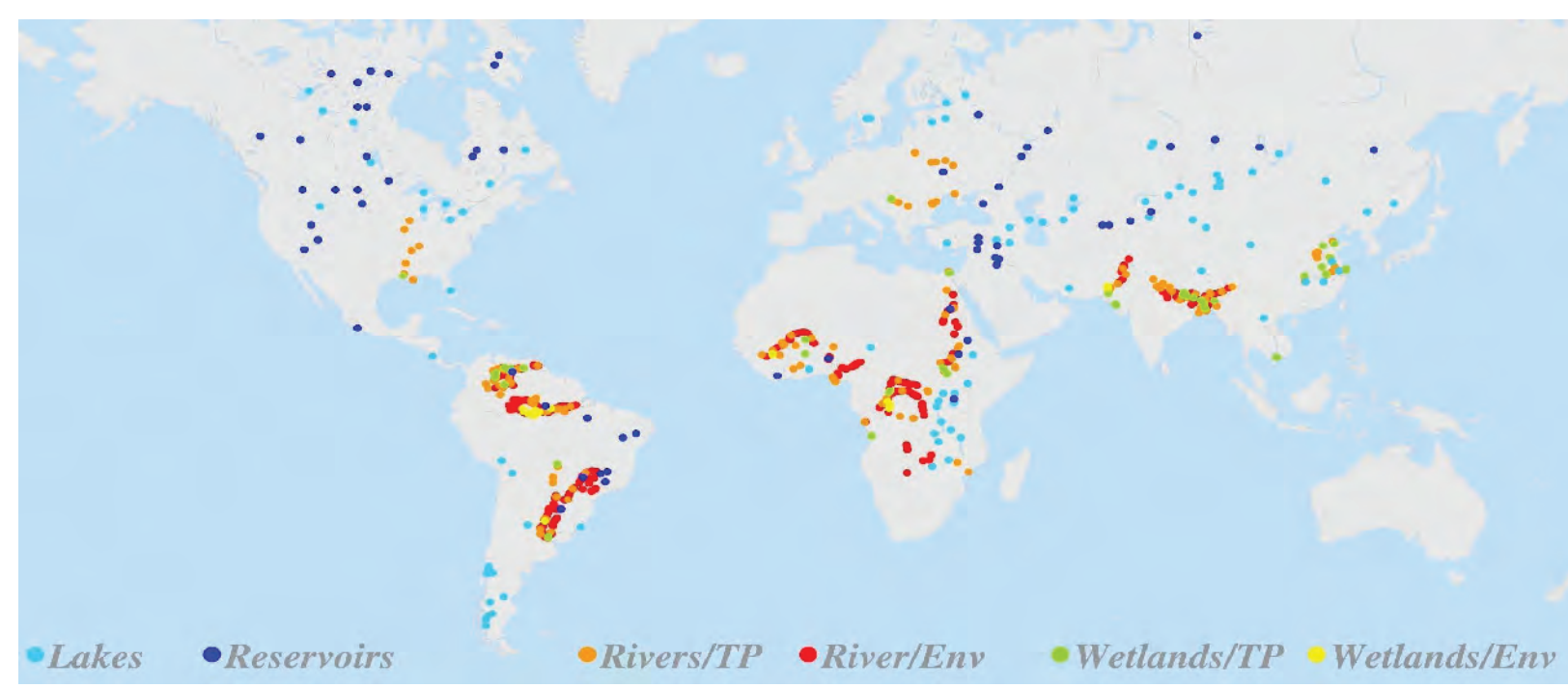
Upcoming :

- High-resolution SLA (eg, 10/20hz – 300/600m)
- Along-Track MSS and tidal constants
- New zones

Hydroweb

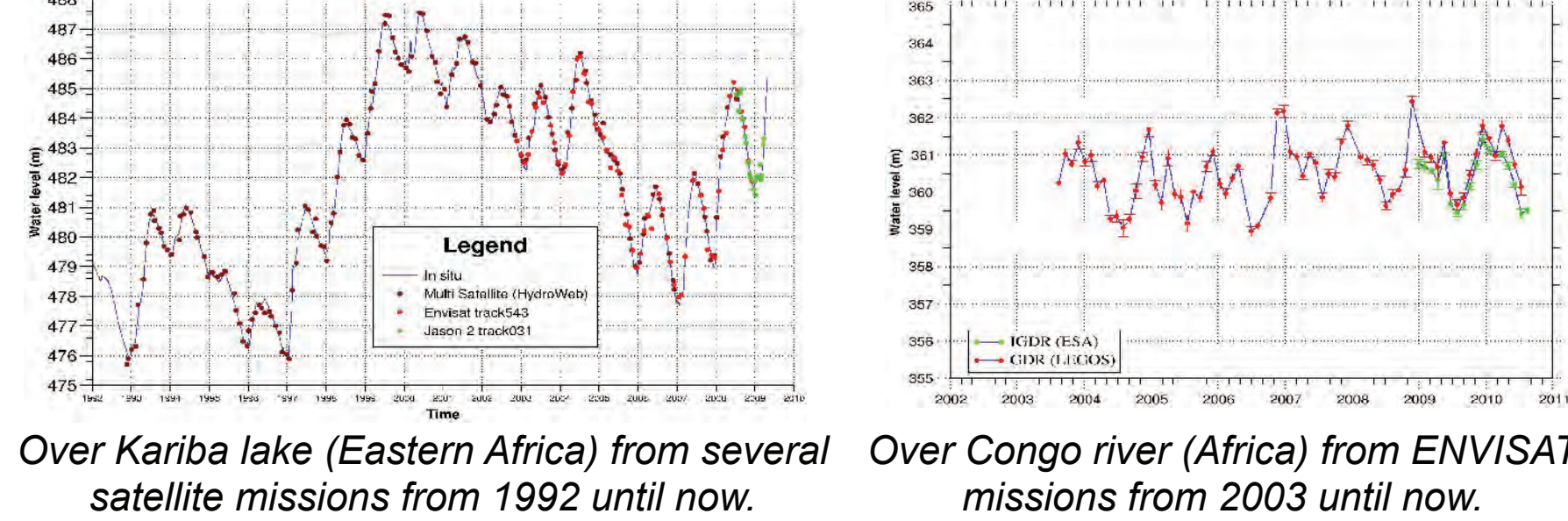
<http://ctoh.legos.obs-mip.fr/products/hydroweb>

Hydroweb provides near real-time time series of water level on the lakes, rivers and flooded plains of the planet. We use altimeter measurements from several missions (Topex, ERS-1 & 2, GFO, Envisat, Jason).



In 2010 we set up an automaton for updating the time series. One dedicated for lakes (multi satellite) and the other for rivers overflow by Envisat.

Time series obtained by altimetry



Over Kariba lake (Eastern Africa) from several satellite missions from 1992 until now. Over Congo river (Africa) from ENVISAT missions from 2003 until now.

Upcomings :

- Automatic updating of virtual stations on the rivers using Jason-2
- Ranges from Pistach project (thanks to CLS)
- Topex overland from CASH project (thanks to CLS)
- ERS 1&2 overland (thanks to ESA)
- Snow depth based on SSM/I data

Surface Currents

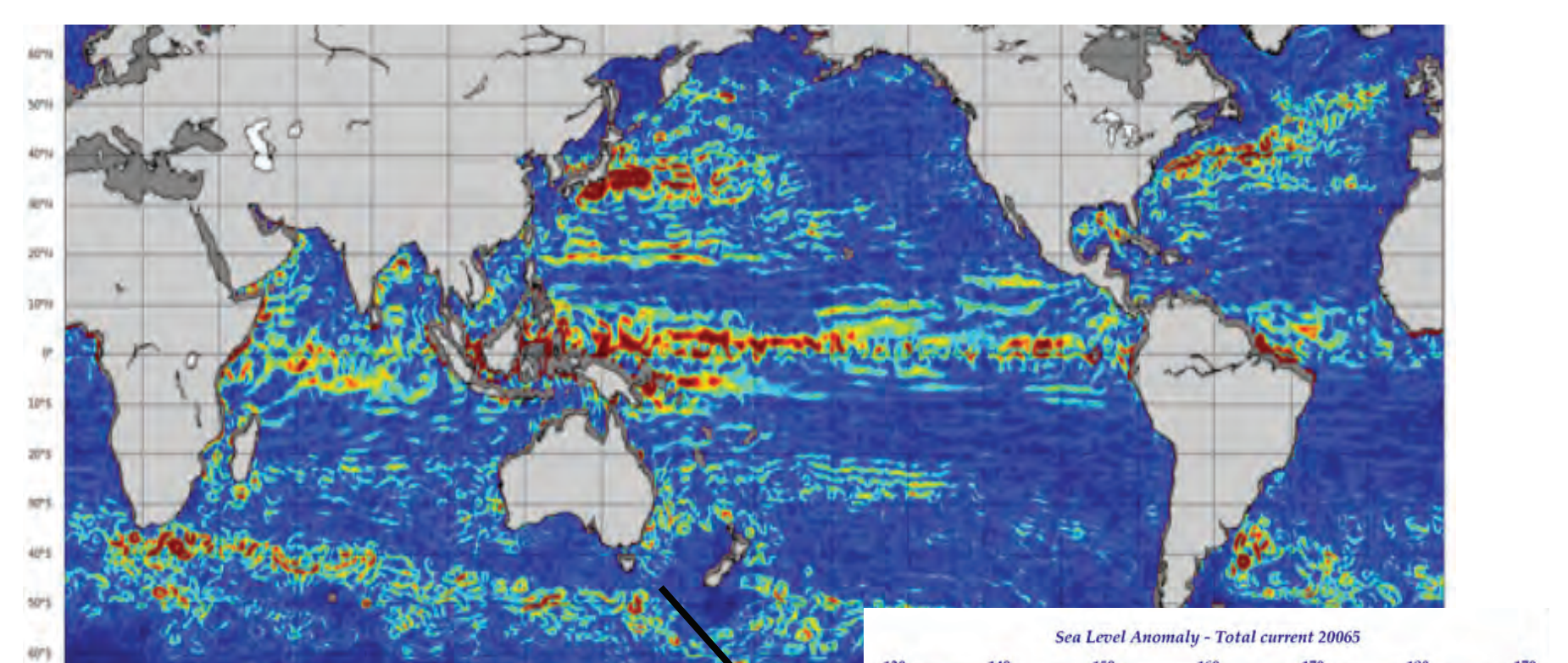
<http://ctoh.legos.obs-mip.fr/products/global-surface-currents>

Global ocean – 2000-2009 – weekly – 1/4°

The CTOH surface current field combines geostrophic current anomalies from altimetry, Ekman currents at 15 m depth from Quikscat scatterometry and the mean geostrophic circulation from a climatological mean sea surface product (RIO 09).

Available CTOH global surface current products :

- Surface absolute geostrophic velocities (AVISO – DT–2010 & MDT RIO09)
- Surface Ekman velocities at 15 m depth (QUIKSCAT 1999-2009)
- Total surface current
- Eddy kinetic energy fields
- Also monthly & annual mean fields



Above : Mean amplitude of surface currents over the period 2000-2009

Right : snapshot of total surface currents in the tropical Pacific for 12 Aug 2004, overlaid on sea level anomaly (in colour)

Ref: « Global surface currents: a high-resolution product for investigating ocean dynamics » by Joel Sudre and Rosemary A. Morrow in Ocean Dynamics (2008)

Eddy Kinetic Energy (EKE)

Global ocean – 2000-2009 – every 4 days – ~4 km resolution

Finite-size Lyapunov exponents (FSLEs) are calculated backward-in-time, from AVISO DT-UPD geostrophic absolute currents (with mean from RIO05). Initial and final separations: 0.04 deg and 0.6 deg.; max integration window: 200 days

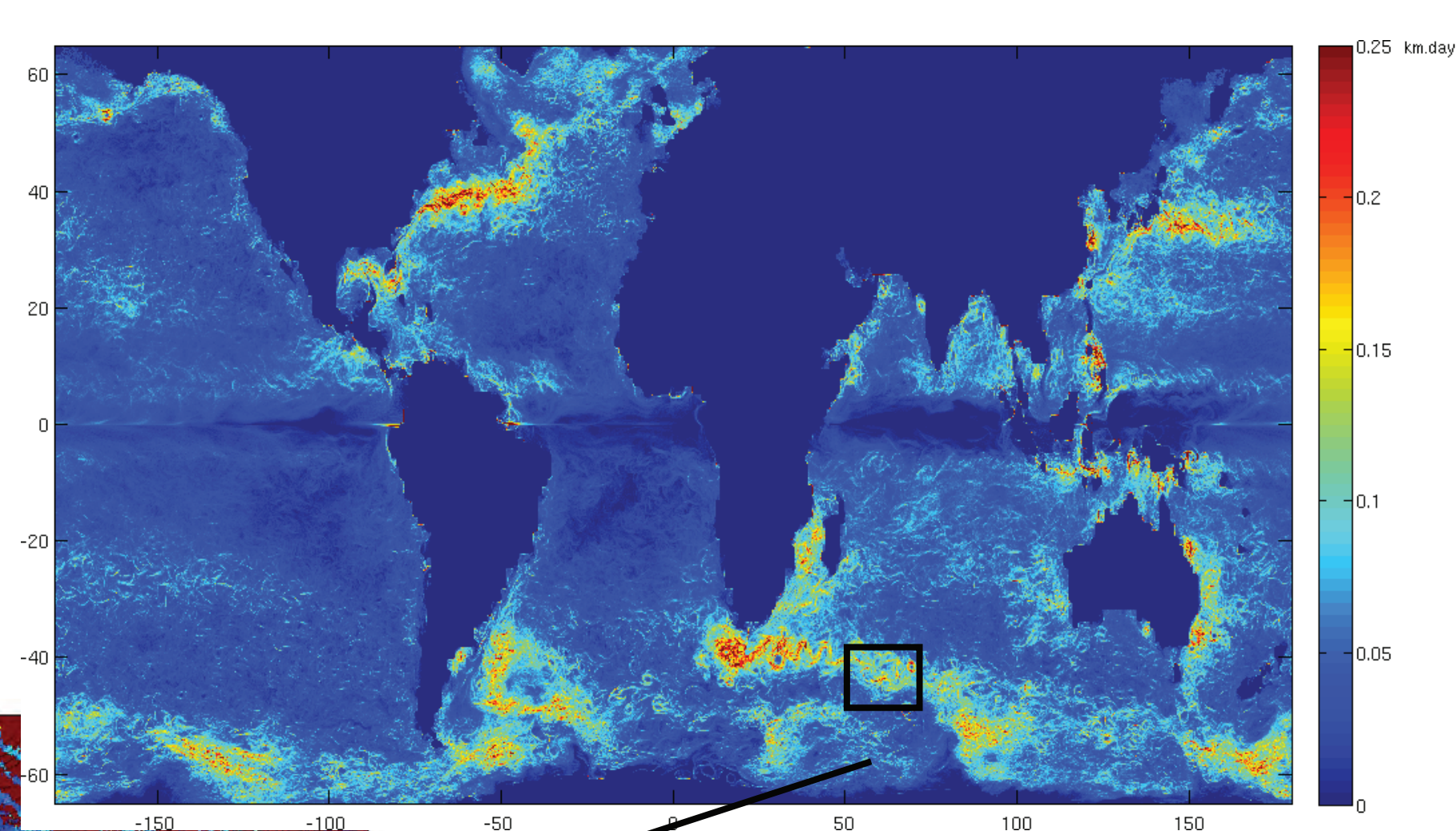
FSLEs provide exponential rate of separation of particle trajectories advected by altimetric surface velocities. A line of local maxima of FSLEs (more precisely, a ridge) can be used to predict tracer fronts induced by passive, horizontal stirring. Although FSLEs are calculated from the mesoscale (100 km resolution) geostrophic velocities, their patterns are well

FSLE position & strength (lambda) based on analyses by F. D'Ovidio (LOCEAN, Paris) are available from the CTOH.

F. d'Ovidio et al. "Comparison between Eulerian diagnostics and the finite-size Lyapunov exponent computed from altimetry in the Algerian Basin", Deep Sea Res. I, 56, 15-31 (2009).

Upcoming :

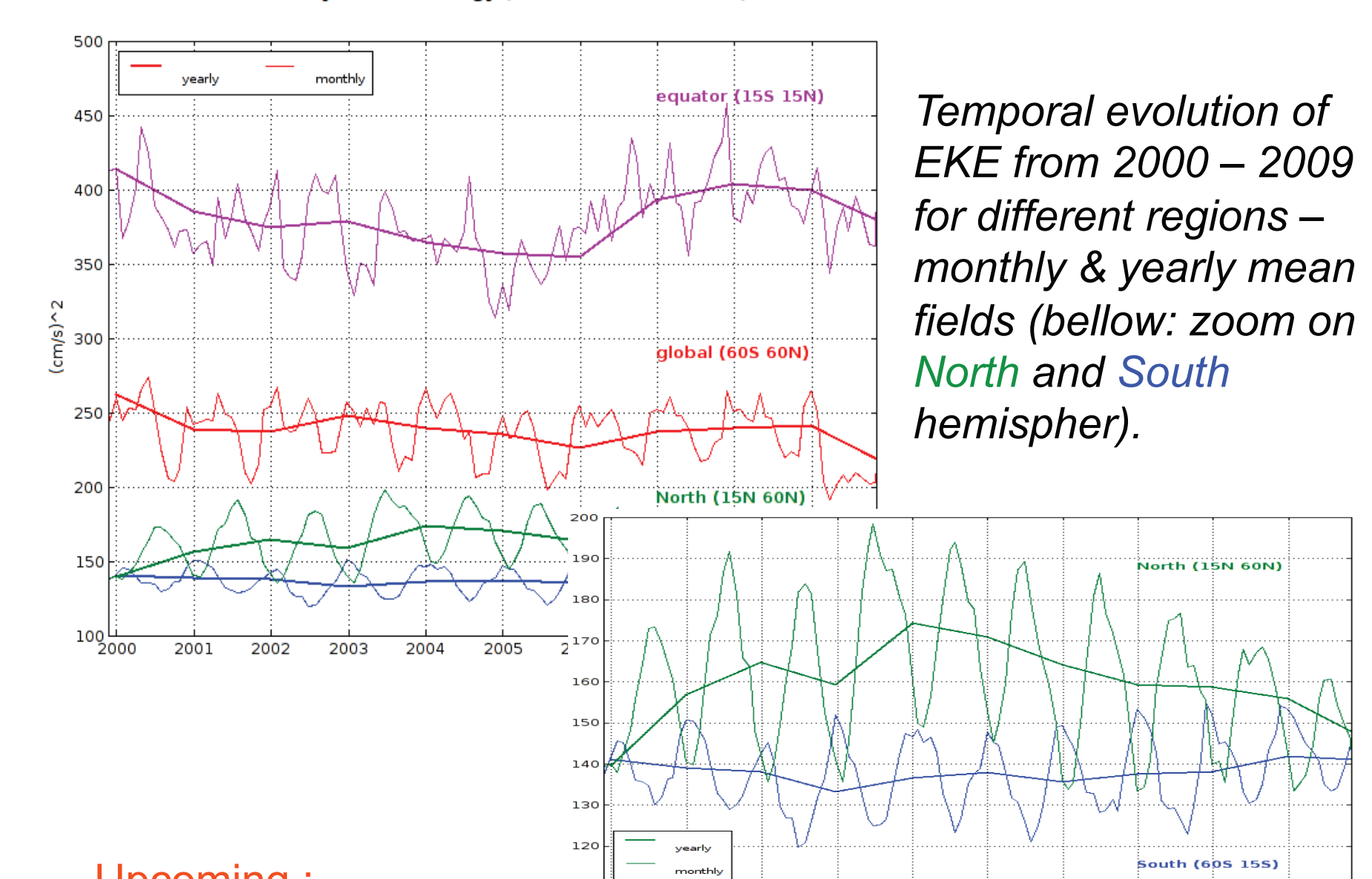
- direct web access (visualisation and download)



Above : 2003-2006 average of the stirring rates derived from FSLEs over the global oceans, calculated from AVISO surface geostrophic velocities.

Left : snapshot of FSLE (black contours) downstream of Kerguelen overlaid on an ocean colour image.

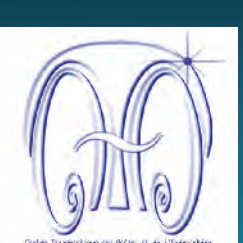
Mean Eddy Kinetic Energy (dec 1999 - nov 2009)



Temporal evolution of EKE from 2000 – 2009 for different regions – monthly & yearly mean fields (below: zoom on North and South hemisphere).

Upcoming :

- Ekman from ECMWF (1992-2010+)
- enlarged covered period from 1992 to 2010
- direct web access (visualisation and download)



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