TOPEX Altimeter along track "GAPS" wind and wave data

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Introduction

This report describes the data extracted from the SOC "GAPS" altimeter data archive, for TOPEX passes close to the three JERICHO sites at Holderness, Lyme Bay and St. Gowan. These data were extracted to generate boundary conditions for the shallow water modelling.

Data Source

The data are taken from the GAPS (Global Altimeter Processing System) altimeter data archive maintained at the Southampton Oceanography Centre. These data are reformatted and regridded GDR data - the regridding interpolates data onto a fixed grid, such that data on repeat passes are co-located. The data span 6 years, from September 1992, to the end of August 1998.

Track Selection

Figures 1, 2 and 3 show the TOPEX tracks in the vicinity of the three JERICHO modelling sites. Data extracted near Holderness are taken from tracks 61, 120, 239; from tracks 61 and 146 for Lyme Bay; and from tracks 146 and 139 for St Gowan.
Note that where a track goes onto land from the sea, the altimeter can provide good measurements until the altimeter footprint contains some land (up to approximately 7km offshore). However, when the altimeter is coming off the land, it may take the altimeter 3-4 seconds to regain "lock" on the ocean surface, thus reliable measurements may only be provided some 30-40 km after leaving land. Land of any form within the altimeter footprint will fatally corrupt the return signal, including small islands, sandbanks uncovered by the tide, etc.

Data Description

Data have been extracted into ascii files containing the following fields:
year, month, day, hour, minute, second, latitude, longitude, significant wave height (m) , 10m wind speed (ms^{-1}), Tz estimate (s) , radar backscatter (dB).

The data have been checked automatically, and then manually, to remove as far as possible non-ocean or otherwise invalid data. Be aware that some unreliable data may remain. Default values are 99.90 or 99.99 for all fields. Because of the experimental nature of the altimeter wave period algorithm some wave period estimates are negative. These can confidently be assumed to be incorrect. The data have been calibrated according to Cotton (1998), and the recent drift in TOPEX significant wave height, reported by various authors, corrected for by subtracting 0.4mm from the reported significant wave height for each day since 1st January 1997.

The data are extracted into single files for each track at each location:
hold061.all, hold 120.all, hold 239.all, lymb061.all, lymb146, stgo146.all, stgo239.all

I have attempted to ensure the file structure is consistent throughout, so that for each altimeter track there is a consistent number of records for each altimeter pass along a track.
All data are available via ftp from SOS: **ftp satobsys.co.uk**, login as **anonmyous** with userid, **cd pub/Jericho**.

Holderness

Data in three files from three tracks. Summary by track/file below:

hold061.all [53.52°N, 1.43°E; 53.91°N, 2.00°E]
11 records per pass, 217 passes, 2387 records. Track comes off land at the southern entrance to the Wash. Highest significant wave height (Hs) in this file of ~7m on 21/02/93.

hold120.all [54.43°N, 0.05°E; 53.51°N, 1.44°E]
25 records per pass, 215 passes, 5375 records. Track runs south-east parallel to coast (~50-60km offshore). Hs > 5m on 15/02/94, 19/02/96.

hold120.all [54.40°N, 0.09°W; 54.97°N, 0.81°E]
16 records per pass, 207 passes, 3312 records. Track leaves coast N of Filey. Hs > 5m on 14/09/93 and 25/01/96, Hs ~ 7m on 16/09/94.

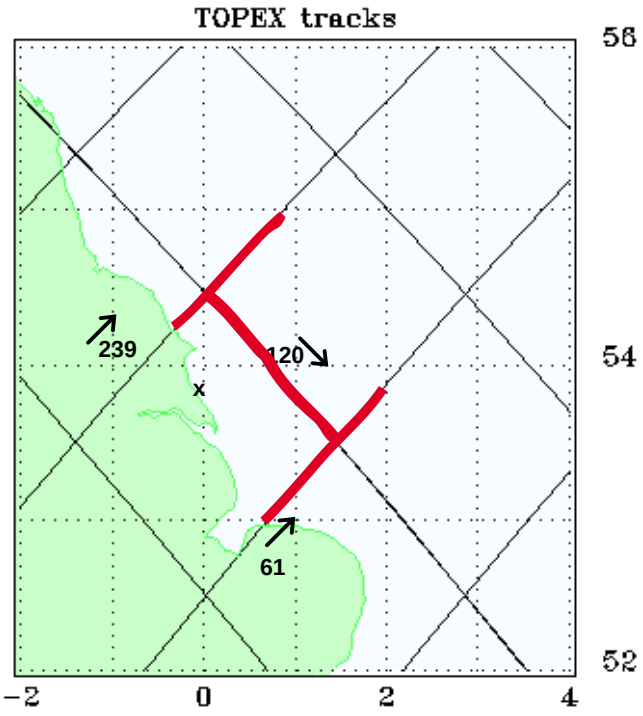


Figure 1. Topex 10-day repeat tracks off the NE coast of England. Data were extracted from tracks 61, 120 and 239. Direction of satellite travel is indicated. Approximate location of Holderness marked by 'X'.

Lyme Bay

Data in two files from two tracks. Summary by track/file below:

lymb061.all [50.15°N, 2.97°W; 50.52°N, 2.53°W]
10 records per pass, 205 passes, 2050 records. Track goes onto land just west of Portland Bill. Hs > 4m on 25/10/92, 5/12/93, 7/12/94, 27/12/94 and 17/02/97

lymb146.all [50.37°N, 2.96°W; 50.04°N, 2.57°W]
9 records per pass, 195 passes, 1755 records. Track comes off land in the west of Lyme Bay. Hs > 5m on 9/12/93, 19/01/95, 10/2/96, 4/1/98, 3/4/98.

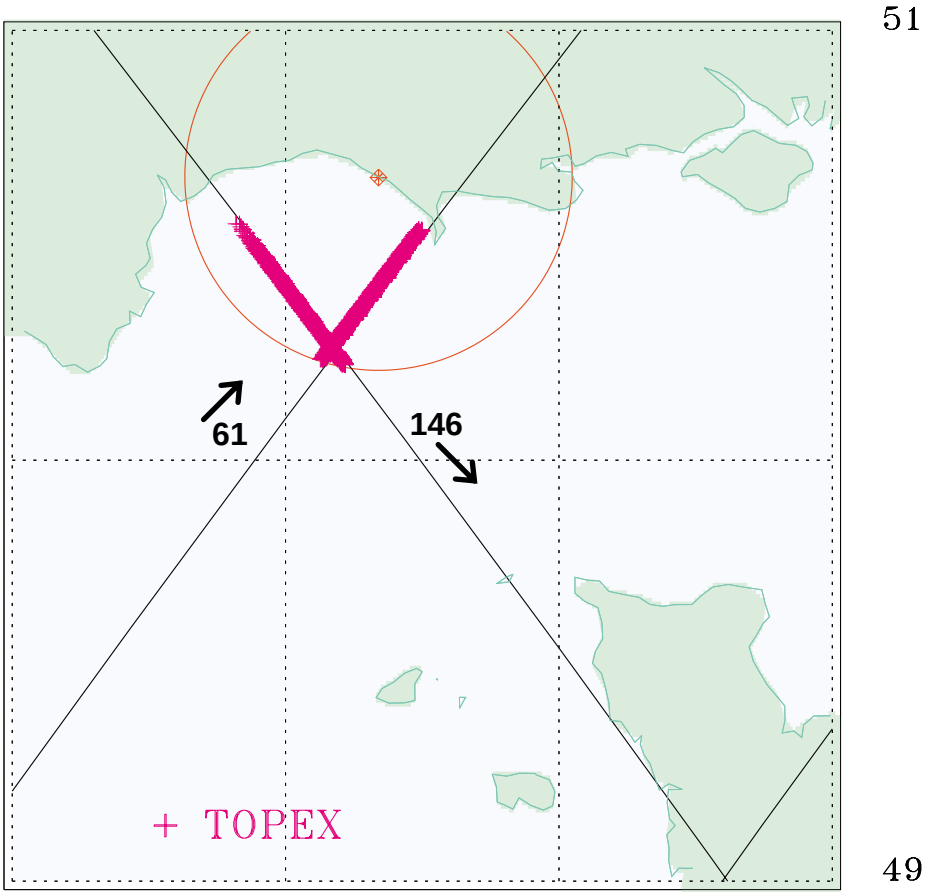


Figure 2. Topex 10-day repeat tracks near Lyme Bay. Data were extracted from tracks 61 and 146. Direction of satellite travel is indicated. Approximate location of bottom pressure recorder at West Bexington marked by 'X'.

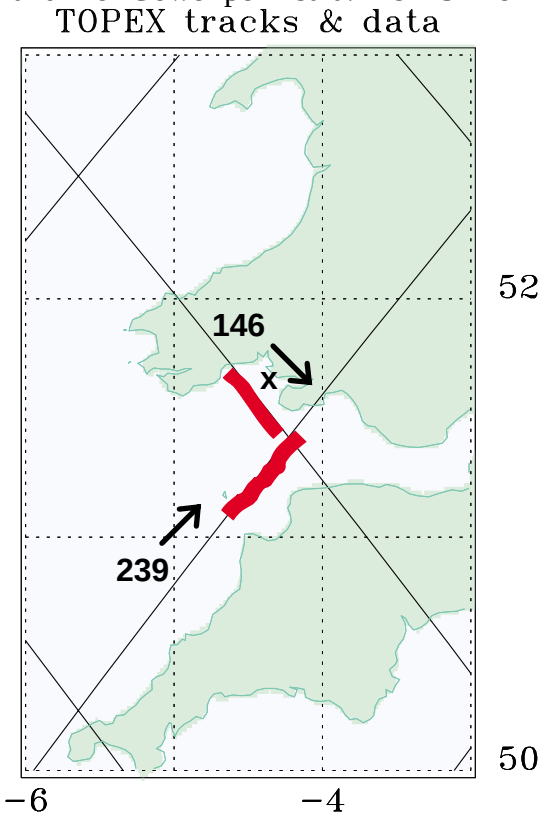
St Gowan

Data in three files from two tracks. Summary by track/file below:

stgo146.all [51.63°N, 4.51°W; 51.27°N, 4.05°W]
Unedited file, containing many doubtful data values - to allow inspection for individual events. Variable number of records per pass, 1864 records. Track leaves land at west of Carmarthen Bay - data at NW end of track very intermittent.

stgo146.sht [51.39°N, 4.20°W; 51.31°N, 4.10°W]
Restricted version of ***stgo146.all*** . Data from crossover point southwards. 3 records per pass, 166 passes, 498 records. Hs > 6m on 9/12/93 and 04/01/98.

stgo239.all [51.04°N, 4.74°W; 51.48°N, 4.18°W]
12 records per pass, 183 passes 2196 records. Track runs parallel to N Cornish coast, before going onto land E of Gower peninsula. Hs > 5m on 22/12/93, 24/1/97; Hs ~9m on 28/10/96.



References:

P.D. Cotton, 1998,'A Feasibility Study for a global satellite buoy intercalibration experiment', SOC research and consultancy report no. 26.