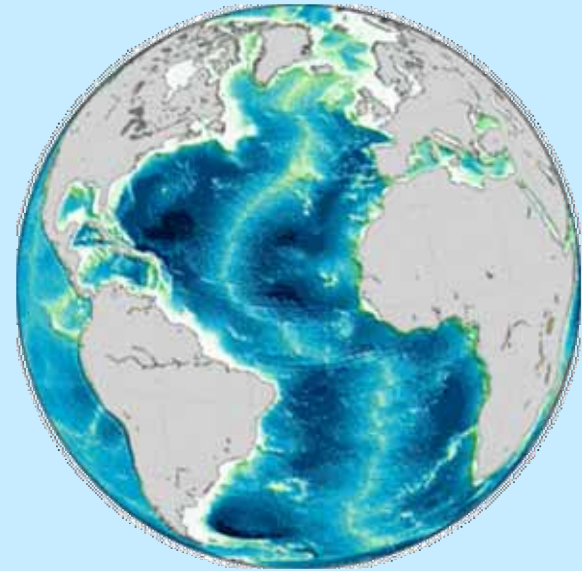


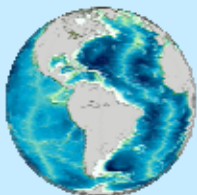
Satellite Tracking and Analysis Tool

*Building capacity to manage,
analyze and publicly share
marine vertebrate tracking data
and integrate movements with
oceanographic data*



*Michael Coyne
Marine Geospatial Ecology Lab
Duke University*

*Brendan Godley
Marine Turtle Research Group
University of Exeter in Cornwall*



STAT

SEATURTLE.ORG

<http://www.seaturtle.org/tracking/>

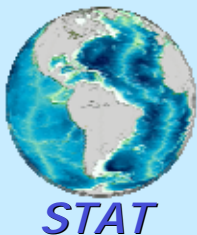
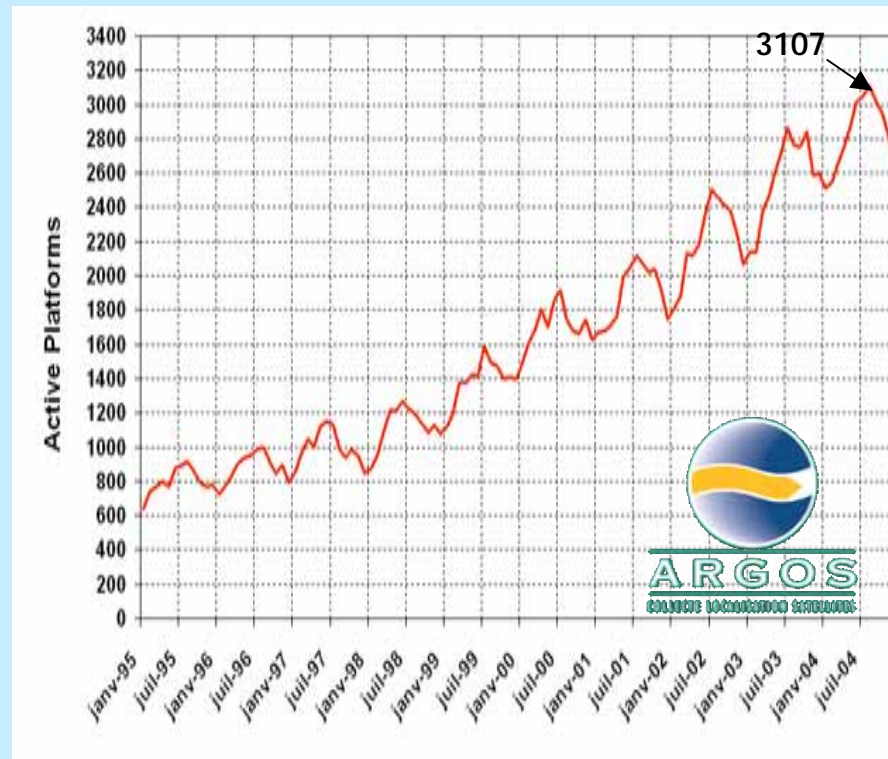


seaturtle.org

Animal Tracking via Argos

Five-fold increase in number of animals tracked over last nine years

Improving hardware and software



<http://www.seaturtle.org/tracking/>



Goals

Automate the process of working with satellite tracking data

Provide standard tools for manipulating and analyzing tracking data

Extract maximum value from relatively expensive tracking data

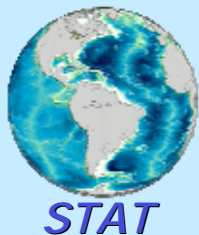
Preserve data!

Education and outreach

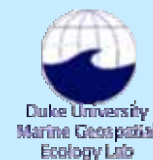
Collaborate



© Cayman Islands Department of Environment



<http://www.seaturtle.org/tracking/>



Satellite Tracking and Analysis Tool

Automatic retrieval and
archiving of Argos data

Data back-up

Built-in QA/QC protocols

Data scrubbing, filtering and
analyses

Automatic map creation

Integrated bathymetry, sst, ssh,
chlorophyll, surface currents

Education and outreach

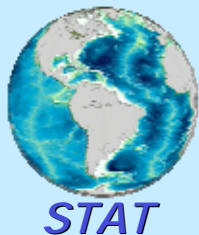
Encourage collaboration



© Cayman Islands Department of Environment



© Michelle Hester/Oikonos



<http://www.seaturtle.org/tracking/>



Data Management

There are a number of tools available for parsing and mapping Argos data

STAT is...

Platform independent

Open access

Basic functions are autonomous

FREE

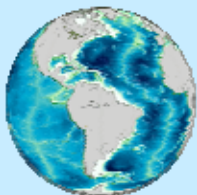
I had no idea about GIS and PTT data before STAT and now I can make fantastic maps and analysis. I was actually making a scatter plot in excel before STAT."

Alan Rees

Archelon, The Sea Turtle Preservation Society of Greece



© Warren Baverstock
Dubai Rehab and Release Project



STAT

<http://www.seaturtle.org/tracking/>



seaturtle.org

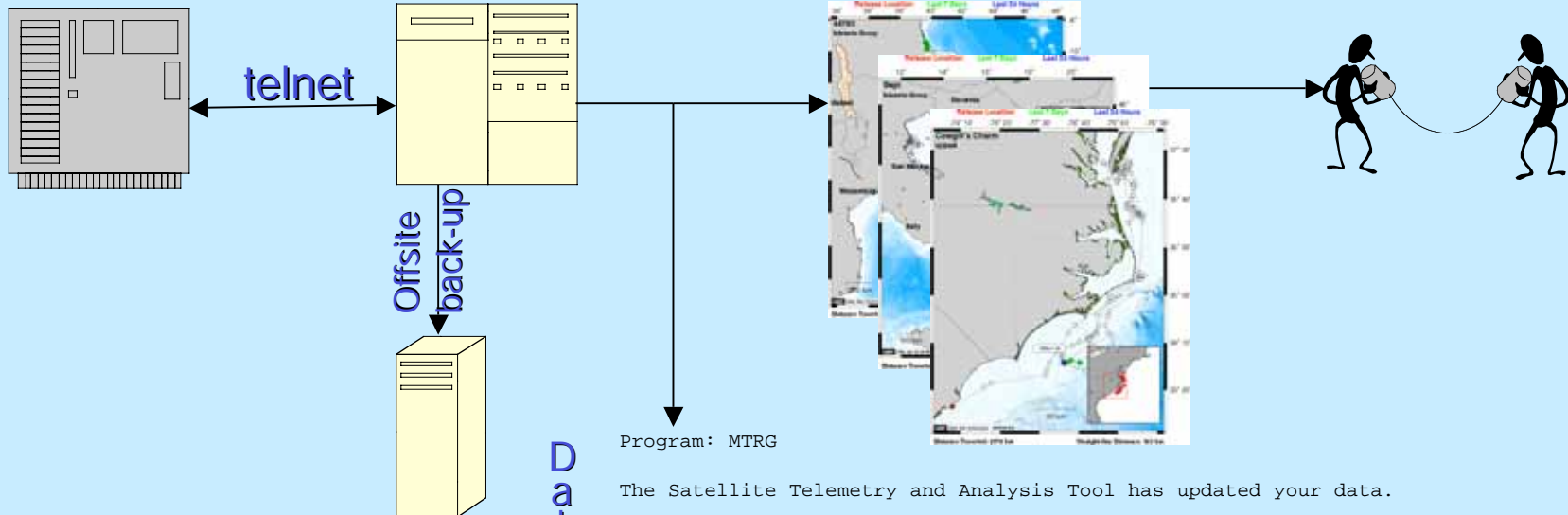
Overview

ARGOS

seaturtle.org

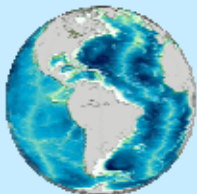
Maps updated

E-mail updates



"Now I can go on vacation and not worry about telnetting to Argos every 7 days."

Brendan Godley
Marine Turtle Research Group



STAT

Data Summary

Program: MTRG

The Satellite Telemetry and Analysis Tool has updated your data.

291 uplinks read from ARGOS for last 8 days.

20 new uplinks were added to the database.

9 modified uplinks were replaced in the database.

Total processing time: 11 secs

New Data Summary:

Tag	Total	3	2	1	0	A	B	Z	-
29034	3	0	0	0	0	2	0	0	1
29050	2	0	0	1	1	0	0	0	0
29051	1	0	1	0	0	0	0	0	0
29053	2	0	0	1	1	0	0	0	0
36638	2	0	0	0	0	0	1	0	1
42561	10	0	2	0	1	1	3	0	3

<http://www.seaturtle.org/tracking/>



seaturtle.org

Upload Data

Satellite Tracking and Analysis Tool - Mozilla Firefox

http://www.seaturtle.org/cgi-bin/argos/DIAGupload.pl?uid=1

Satellite Tracking and Analysis Tool

Home Edit Profile Projects Tags

DIAG Data Uploader

This form will upload a text file containing ARGOS DIAG formatted data and allow you to insert it into the database. You can also upload your monthly ARGOS DIAG file to QA/QC the data in the database. Without any of the options checked, the tool will display a portion of each uploaded record that either does not appear in the database or records with a matching timecode that have other discrepancies. Next to each flagged record will be an "Insert" or "Replace" button, as appropriate. Click the button and the database will be updated with that record. You can check the auto-insert or auto-replace options and the system will make all updates automatically without asking you to confirm each change. Finally, the uploader will look across the range of dates and tag ids included in the uploaded file and flag any records in the database that do not match. Each of these will have a delete button next to it so that you may delete the record.

Prognum: 01892 - OR -

Data File: G:\Biologging\test.txt Browse

Navigate to the data file on your hard drive and select. The data file should be a plain text file containing DIAG formatted ARGOS data.

Options

- Automatically insert new records (do not ask me to confirm)
- Automatically replace records with matching timecode/utc (do not ask me to confirm)

Upload Data File

Done

Satellite Tracking and Analysis Tool - Mozilla Firefox

http://www.seaturtle.org/cgi-bin/argos/DIAGupload.pl?uid=10file_ru

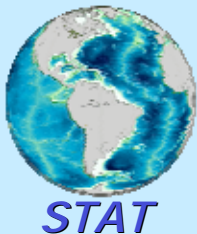
INSERT: 55618 2005-04-13 08:26:52 B -19.993 -36.229 -19.520 -37.579 81 250 48 1036293	Insert
INSERT: 55618 2005-04-13 10:08:46 B -20.096 -36.130 -24.356 -17.137 81 268 46 5682153	Insert
INSERT: 55618 2005-04-13 11:04:13 A -20.135 -36.166 -30.136 9.550 81 268 47 15023254	Insert
INSERT: 55618 2005-04-13 11:42:59 0 -20.138 -36.176 -13.573 -65.089 81 268 47 1697254	Insert
INSERT: 55618 2005-04-13 12:39:43 B -20.200 -36.030 -19.635 -38.650 81 268 48 7845525	Insert
INSERT: 55618 2005-04-13 16:05:37 1 -20.307 -36.102 -12.567 -2.796 82 279 47 13215056	Insert
INSERT: 55618 2005-04-13 17:45:11 0.000 0.000 0.000 0.000 82 279 48 15944718	Insert
INSERT: 55618 2005-04-13 19:09:23 B -20.398 -36.049 -10.565 10.504 82 279 50 5646864	Insert
INSERT: 55618 2005-04-13 19:19:29 Z -20.432 -36.007 -19.641 -33.472 82 279 47 11007538	Insert
INSERT: 55618 2005-04-15 21:45:36 B -20.631 -35.676 -26.437 -63.233 80 509 45 8519167	Insert
INSERT: 55618 2005-04-15 23:55:11 A -20.579 -35.656 -24.980 -55.511 81 509 46 5659129	Insert
INSERT: 55618 2005-04-16 11:04:41 0 -20.586 -35.414 -17.935 -47.289 79 319 46 1918230	Insert
INSERT: 55618 2005-04-16 11:36:53 B -20.575 -35.414 -26.960 -7.325 79 319 46 10817013	Insert
INSERT: 55618 2005-04-16 13:14:55 2 -20.555 -35.388 -16.241 -54.487 80 319 50 11085340	Insert
INSERT: 55618 2005-04-16 15:35:20 B -20.507 -35.465 -9.733 13.305 80 391 48 14700654	Insert
INSERT: 55618 2005-04-16 17:14:59 0 -20.479 -35.518 -20.309 -34.760 80 391 48 342605	Insert
INSERT: 55618 2005-04-16 18:10:23 1 -20.448 -35.456 -12.369 0.892 80 391 49 1904929	Insert
INSERT: 55618 2005-04-16 18:53:02 0 -20.424 -35.444 -30.994 -83.015 80 391 48 9441901	Insert
INSERT: 55618 2005-04-16 19:37:31 0 -20.421 -35.452 -13.569 -4.047 80 391 48 9683157	Insert
INSERT: 55618 2005-04-19 04:10:38 0 -20.485 -35.547 -25.101 -14.901 81 240 46 4515504	Insert
INSERT: 55619 2005-02-11 23:22:17 0 -12.588 -38.026 -1.506 10.364 79 00 49 14936862	Insert
INSERT: 55619 2005-02-11 23:59:30 0.000 0.000 0.000 0.000 78 584 177 14803424	Insert
INSERT: 55619 2005-02-12 19:29:45 1 -12.572 -38.036 -3.873 0.348 85 846 49 14349022	Insert

3085 records read
3085 new records to add
0 records to be updated
0 records to be deleted

Done

Add archived data

QA/QC database against Argos
monthly data CD



<http://www.seaturtle.org/tracking/>



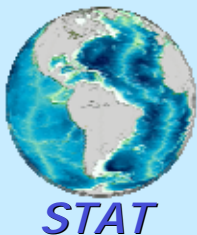
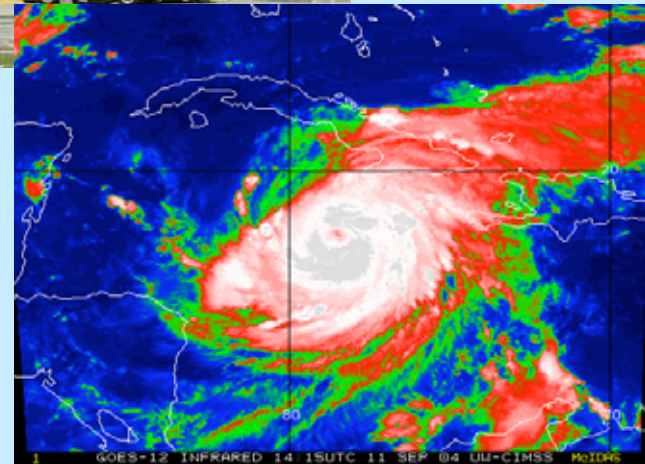
Back-up and Preservation

Do you know where your data are?



“reliable OFF-ISLAND back-up for data (e.g. the “national hurricane plan” was for government documents to be archived at the National Archives, which got twelve feet of flooding during Ivan -- the rest of the “plan” was worse...)”

Janice Blumenthal
Cayman Island Dept of Environment
and Marine Turtle Research Group



<http://www.seaturtle.org/tracking/>



Tag Management

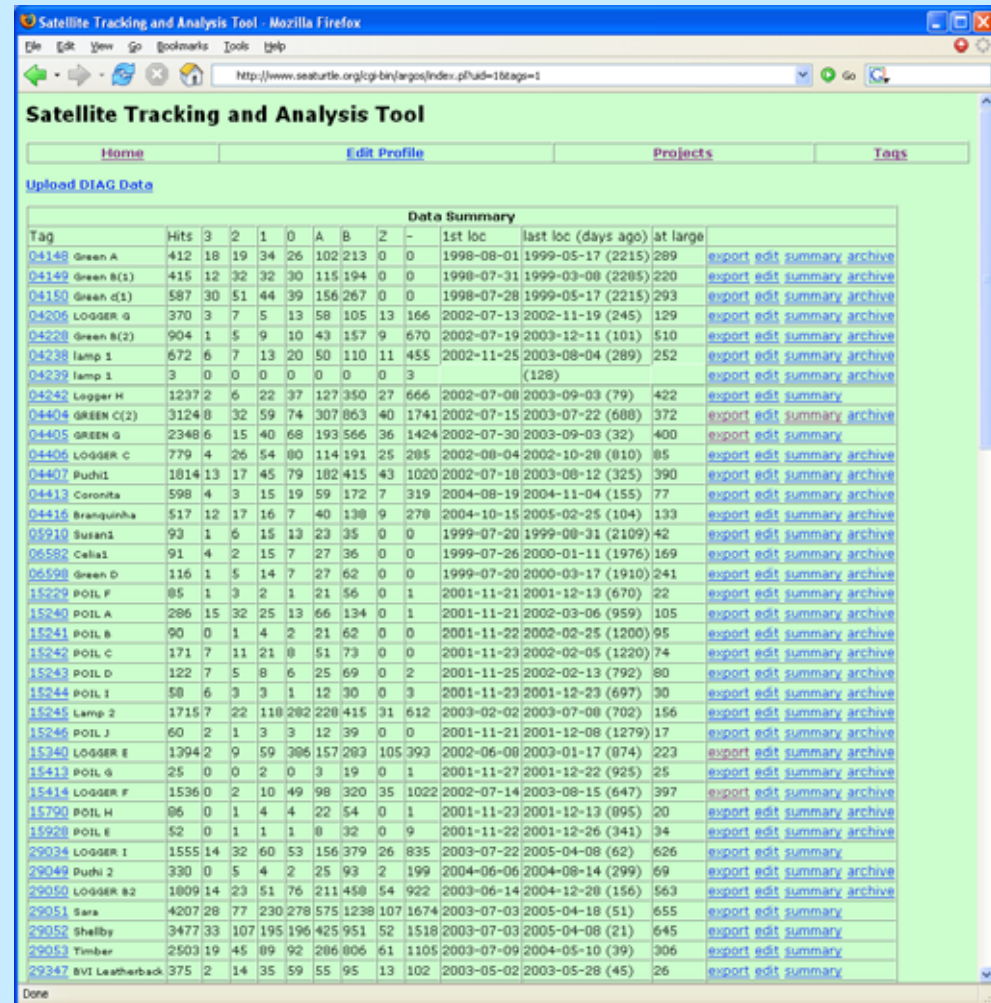
Data Summary

Tag configuration

Data editing

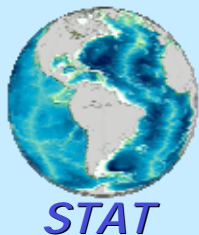
Summary tables and graphs

Export



The screenshot shows a web browser window titled "Satellite Tracking and Analysis Tool - Mozilla Firefox" with the URL "http://www.seaturtle.org/cgi-bin/tags/index.php?id=18&tag=1". The page has a navigation menu with "Home", "Edit Profile", "Projects", and "Tags". Below the menu is a "Data Summary" table with columns for Tag, Hits, and various tracking metrics. Each row includes a "tag" name, a "Hits" column, and several columns of numerical data. The table ends with a "Done" button.

Tag	Hits	3	2	1	0	A	B	Z	-	1st loc	last loc (days ago)	at large	
04148 Green A	412	18	19	34	26	102	213	0	0	1998-08-01	1999-05-17 (2215)	289	export edit summary archive
04149 Green B(1)	415	12	32	32	30	115	194	0	0	1998-07-31	1999-03-08 (2285)	220	export edit summary archive
04150 Green d(1)	587	30	51	44	39	156	267	0	0	1998-07-28	1999-05-17 (2215)	293	export edit summary archive
04206 LOGGER g	370	3	7	5	13	58	105	13	166	2002-07-13	2002-11-19 (245)	129	export edit summary archive
04228 Green B(2)	904	1	5	9	10	43	157	9	670	2002-07-19	2003-12-11 (101)	510	export edit summary archive
04238 lamp 1	672	6	7	13	20	50	110	11	455	2002-11-25	2003-08-04 (289)	252	export edit summary archive
04239 lamp 1	3	0	0	0	0	0	0	0	3		(128)		export edit summary archive
04242 Logger H	1237	2	6	22	37	127	350	27	666	2002-07-08	2003-09-03 (79)	422	export edit summary archive
04404 GREEN C(2)	3124	8	32	59	74	307	863	40	1741	2002-07-15	2003-07-22 (688)	372	export edit summary archive
04405 GREEN g	2348	6	15	40	68	193	566	36	1424	2002-07-30	2003-09-03 (32)	400	export edit summary archive
04406 LOGGER C	779	4	26	54	80	114	191	25	285	2002-08-04	2002-10-28 (810)	85	export edit summary archive
04407 Puchi	1814	13	17	45	79	182	415	43	1020	2002-07-18	2003-08-12 (325)	390	export edit summary archive
04413 Coronita	598	4	3	15	19	59	172	7	319	2004-08-19	2004-11-04 (155)	77	export edit summary archive
04416 Branquinha	517	12	17	16	7	40	138	9	278	2004-10-15	2005-02-25 (104)	133	export edit summary archive
05910 Susan1	93	1	6	15	13	23	35	0	0	1999-07-20	1999-08-31 (2109)	42	export edit summary archive
06582 Celia1	91	4	2	15	7	27	36	0	0	1999-07-26	2000-01-11 (1976)	169	export edit summary archive
06598 Green D	116	1	5	14	7	27	62	0	0	1999-07-20	2000-03-17 (1910)	241	export edit summary archive
15229 POIL F	85	1	3	2	1	21	56	0	1	2001-11-21	2001-12-13 (670)	22	export edit summary archive
15240 POIL A	286	15	32	25	13	66	134	0	1	2001-11-21	2002-03-06 (959)	105	export edit summary archive
15241 POIL B	90	0	1	4	2	21	62	0	0	2001-11-22	2002-02-25 (1200)	95	export edit summary archive
15242 POIL C	171	7	11	21	8	51	73	0	0	2001-11-23	2002-02-05 (1220)	74	export edit summary archive
15243 POIL D	122	7	5	8	6	25	69	0	2	2001-11-25	2002-02-13 (792)	80	export edit summary archive
15244 POIL 1	58	6	3	3	1	12	30	0	3	2001-11-23	2001-12-23 (697)	30	export edit summary archive
15245 Lamp 2	1715	7	22	118	282	228	415	31	612	2003-02-02	2003-07-08 (702)	156	export edit summary archive
15246 POIL J	60	2	1	3	3	12	39	0	0	2001-11-21	2001-12-08 (1279)	17	export edit summary archive
15240 LOGGER E	1394	2	9	59	286	157	283	105	393	2002-06-08	2003-01-17 (874)	223	export edit summary archive
15413 POIL G	25	0	0	2	0	3	19	0	1	2001-11-27	2001-12-22 (925)	25	export edit summary archive
15414 LOGGER F	1536	0	2	10	49	98	320	35	1022	2002-07-14	2003-08-15 (647)	397	export edit summary archive
15790 POIL H	86	0	1	4	4	22	54	0	1	2001-11-23	2001-12-13 (895)	20	export edit summary archive
15928 POIL E	52	0	1	1	1	8	32	0	9	2001-11-22	2001-12-26 (341)	34	export edit summary archive
29034 LOGGER I	1555	14	32	60	53	156	379	26	835	2003-07-22	2005-04-08 (62)	626	export edit summary archive
29049 Puchi 2	330	0	5	4	2	25	93	2	199	2004-06-06	2004-08-14 (299)	69	export edit summary archive
29050 LOGGER B2	1809	14	23	51	76	211	458	54	922	2003-06-14	2004-12-28 (156)	563	export edit summary archive
29051 Sara	4207	28	77	230	278	575	1238	107	1674	2003-07-03	2005-04-18 (51)	655	export edit summary archive
29052 Shelby	3477	33	107	195	196	425	951	52	1518	2003-07-03	2005-04-08 (21)	645	export edit summary archive
29053 Timber	2503	19	45	89	92	286	806	61	1105	2003-07-09	2004-05-10 (39)	306	export edit summary archive
29347 BVI Leatherback	375	2	14	35	59	55	95	13	102	2003-05-02	2003-05-28 (45)	26	export edit summary archive



<http://www.seaturtle.org/tracking/>



seaturtle.org

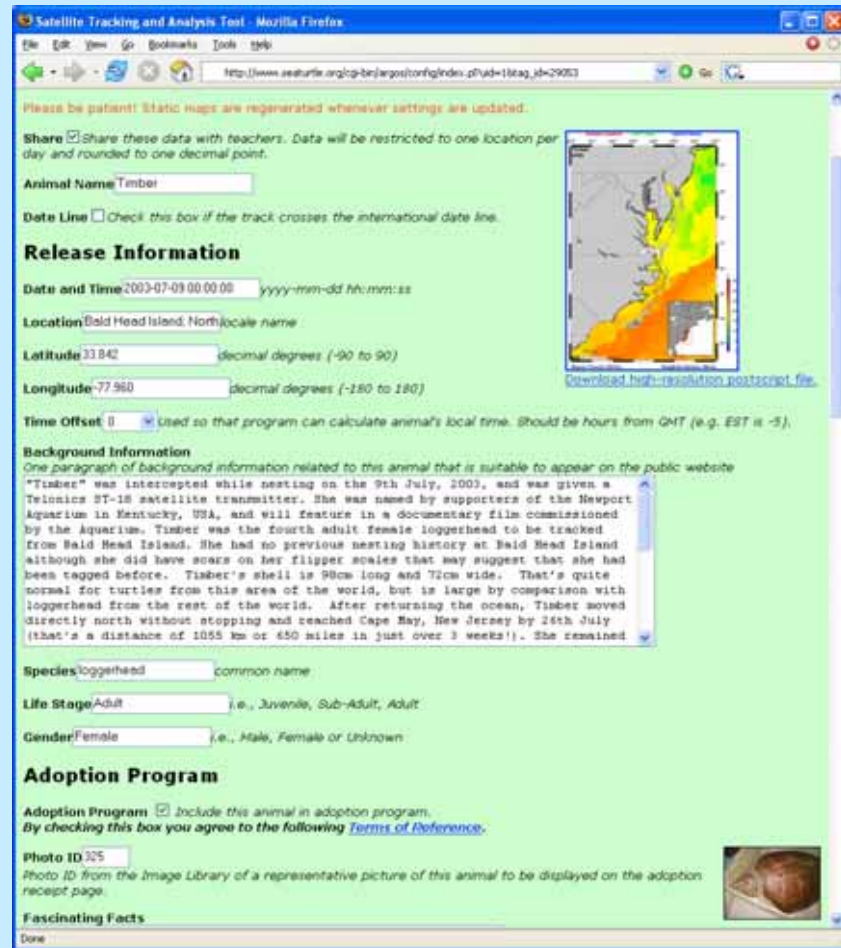
Tag Configuration

Background information

Release information

Select data filters

Set map display preferences and environmental data layers



Satellite Tracking and Analysis Tool - Mozilla Firefox

http://www.seaturtle.org/cgi-bin/ags/tracking/index.php?id=1&tag_id=2903

Please be patient! Static maps are regenerated whenever settings are updated.

Share Share these data with teachers. Data will be restricted to one location per day and rounded to one decimal point.

Animal Name:

Date Line Check this box if the track crosses the international date line.

Release Information

Date and Time: yyyy-mm-dd hh:mm:ss

Location: locale name

Latitude: decimal degrees (-90 to 90)

Longitude: decimal degrees (-180 to 180)

Time Offset: Used so that program can calculate animal's local time. Should be hours from GMT (e.g. EST is -5).

Background Information

One paragraph of background information related to this animal that is suitable to appear on the public website

"Timber" was intercepted while nesting on the 9th July, 2003, and was given a Telonics ST-18 satellite transmitter. She was named by supporters of the Newport Aquarium in Kentucky, USA, and will feature in a documentary film commissioned by the Aquarium. Timber was the fourth adult female loggerhead to be tracked from Bald Head Island. She had no previous nesting history at Bald Head Island although she did have scars on her flipper scales that may suggest that she had been tagged before. Timber's shell is 98cm long and 71cm wide. That's quite normal for turtles from this area of the world, but is large by comparison with loggerhead from the rest of the world. After returning the ocean, Timber moved directly north without stopping and reached Cape May, New Jersey by 26th July (that's a distance of 1055 km or 650 miles in just over 3 weeks!). She remained

Species: common name

Life Stage: i.e., Juvenile, Sub-Adult, Adult

Gender: i.e., Male, Female or Unknown

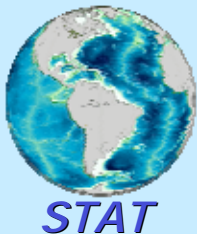
Adoption Program

Adoption Program Include this animal in adoption program.
By checking this box you agree to the following [Terms of Reference](#).

Photo ID:
Photo ID from the Image Library of a representative picture of this animal to be displayed on the adoption receipt page.

Fascinating Facts

Done



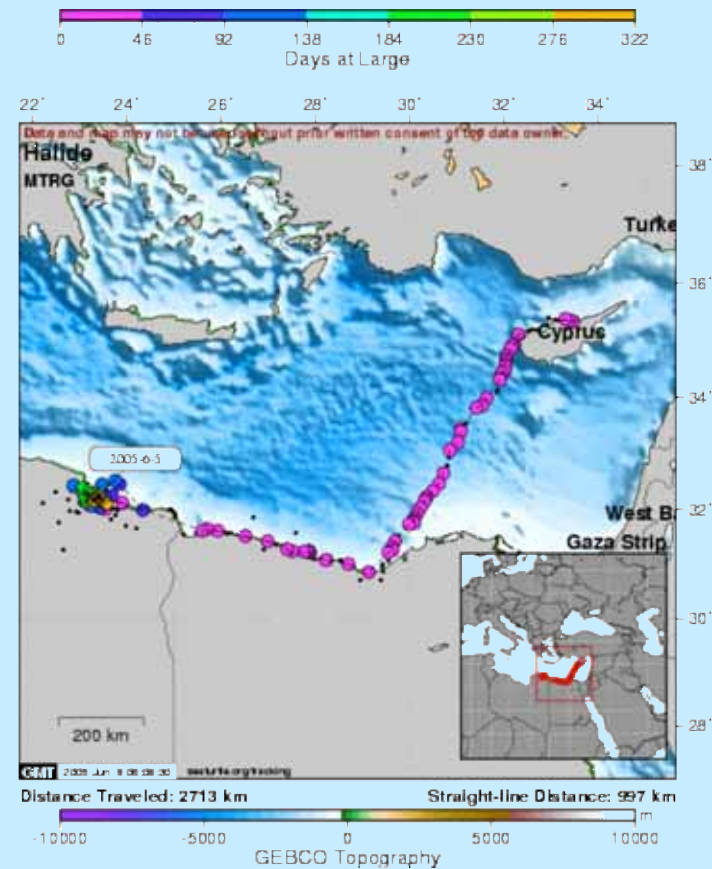
<http://www.seaturtle.org/tracking/>



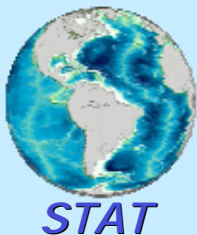
Near Real-Time Mapping

Generic Mapping Tool (GMT)

Open source mapping and visualization package created by researchers at the University of Hawaii & NOAA



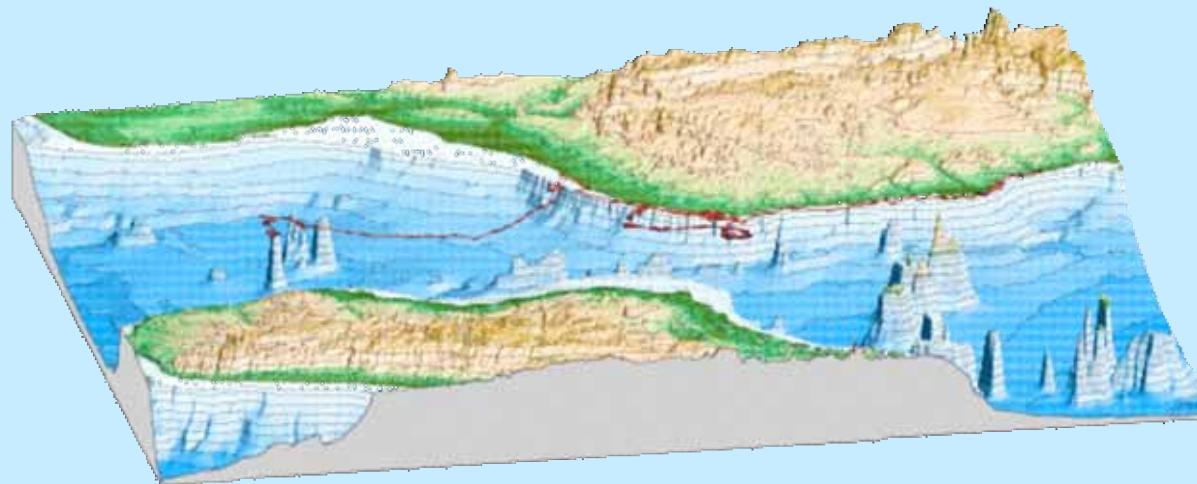
Northern Cyprus Project
Marine Turtle Research Group
University of Exeter in Cornwall



<http://www.seaturtle.org/tracking/>

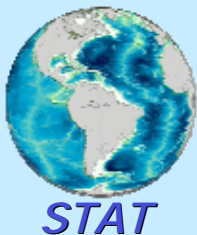


3-D Perspective Maps



STAT 2004 Feb 10 13:26:50

Europa Island Green Turtle Project
Islameta Group, University of Pisa



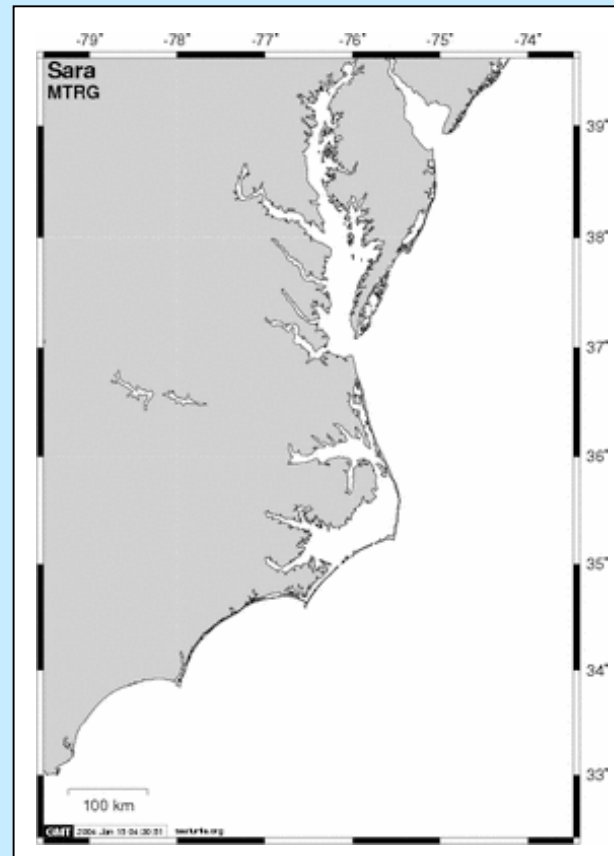
<http://www.seaturtle.org/tracking/>



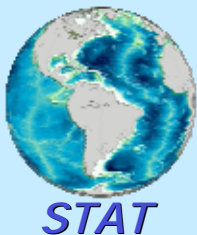
seaturtle.org

Animated Maps

Animated sequences
of daily movement



Loggerhead Turtles 2003: Bald Head Island Project
Marine Turtle Research Group
University of Exeter in Cornwall



<http://www.seaturtle.org/tracking/>



seaturtle.org

Data Filtering

Filter data by exclusion

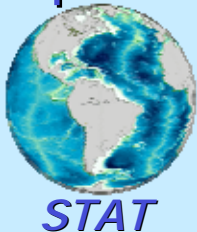
- Speed
- Distance
- Depth
- Time
- Turn angle (azimuth)
- Include/exclude

Save filter sets

Data editing

- Delete
- Add
- Swap
- Revert

Export



Satellite Tracking and Analysis Tool

Program Number: 51872 Tag ID: 49828 (Cize)

Load Filter Set: [dropdown]

Excludes LC: 1 2 3 4 5 6 7 8 9 0 A B Z

Speed: > 5 kph Distance: > km Depth: > m Hours: < 8 Angle: <

Start Date: yyyy-mm-dd End Date: yyyy-mm-dd

Show Excluded: [Update] [Export] [Save Filter] [Maptool] 49828 [Export/Maptool File Name]

lat	lon	depth	distance	angle	speed	hours	cumm	incl	azimuth
155287	2004-08-10 23:48:40	16.055 -22.589 15.705 -24.153 -191.41	15.89 (156)	60.8 15.9	44.00	0.36 0.0	<input type="checkbox"/>	swap edit delete	
156029	2004-08-11 12:22:59	16.112 -22.757 22.850 -8.152 -3786.088 27.02	2275.40 (1892)	0.3 2267.8	181.01	12.87 0.5	<input type="checkbox"/>	swap edit delete	
156031	2004-08-11 18:06:19	16.018 -22.723 13.980 -25.743 -13.05	2268.97 (1925)	69.7 1.2	608.57	3.72 0.7	<input type="checkbox"/>	swap edit delete	
156035	2004-08-11 20:55:56	15.988 -22.794 8.628 -56.877 10.84	8.25 (3798)	2.6 7.5	1.71	4.83 0.9	<input type="checkbox"/>	edit delete	
156793	2004-08-12 22:52:19	15.956 -22.826 6.025 -56.445 -16.92	4.08 (4885)	97.6 11.0	0.16	25.94 3.6	<input type="checkbox"/>	edit delete	
157501	2004-08-13 15:52:27	15.948 -22.308 14.799 -25.740 -1540.97	55.40 (320)	58.6 46.2	3.26	17.00 4.5	<input type="checkbox"/>	edit delete	
157504	2004-08-14 04:26:03	16.022 -22.611 18.077 -31.814 -115.64	33.45 (1039)	131.0 13.1	2.66	12.56 5.3	<input type="checkbox"/>	edit delete	
158211	2004-08-14 11:11:01	16.019 -22.621 10.072 4.181 -105.40	1.12 (2977)	117.0 12.0	0.17	6.76 5.7	<input type="checkbox"/>	edit delete	
158215	2004-08-14 21:26:10	16.050 -22.853 5.632 -71.284 295.84	25.06 (5430)	74.2 13.3	2.44	10.25 6.2	<input type="checkbox"/>	edit delete	
158947	2004-08-15 19:26:40	16.140 -22.812 19.386 -12.642 169.70 0.00	10.94 (1144)	80.9 15.8	0.50	22.01 7.1	<input type="checkbox"/>	edit delete	
159658	2004-08-16 07:52:40	15.995 -22.648 14.561 -16.049 -122.84	23.84 (746)	84.0 9.5	1.92	12.43 8.3	<input type="checkbox"/>	edit delete	
159664	2004-08-16 22:06:53	16.001 -22.773 11.511 -41.928 14.39	13.61 (2142)	79.9 5.0	0.96	14.24 9.9	<input type="checkbox"/>	edit delete	
159669	2004-08-17 07:23:47	15.999 -22.711 12.004 -4.769 -41.76	6.65 (1094)	52.8 3.3	0.74	9.28 9.4	<input type="checkbox"/>	edit delete	
160371	2004-08-18 06:03:52	16.201 -22.387 13.714 -13.373 -1811.31	41.31 (1036)	4.2 42.1	1.82	22.67 10.3	<input type="checkbox"/>	edit delete	

<http://www.seaturtle.org/tracking/>

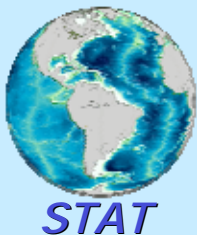


Export to Maptool

Free online GIS tool
available from
SEATURTLE.ORG

Web interface to GMT

Incorporates
environmental data



<http://www.seaturtle.org/tracking/>

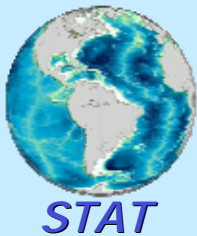
The screenshot shows the SEATURTLE.ORG Maptool web interface in a Mozilla Firefox browser window. The interface is divided into several sections: "Data Source" with a list of files and a "Create Map" button; "Output Options" with checkboxes for PDF, JPEG, and TIFF, and dropdowns for resolution (72dpi); "Base Map" with a projection dropdown (Mercator) and various map style options like "Bathymetry", "SST", and "Relief"; and "Layers" with checkboxes for "Bathymetry", "SST", "Global SST", "Chlorophyll", and "Relief". A map of the West African coast (Senegal, Gambia, Guinea-Bissau) is displayed on the right, showing bathymetry and SST data. The map includes a scale bar (0-10000m) and a coordinate grid. Below the map, there are download options for PostScript, PDF, JPEG, and TIFF files, and a "Maptool: Making a Map" section with instructions on how to use the tool.



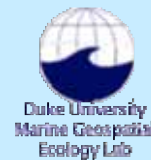
Sharing



© Wendy Cluse/NC Wildlife Resources Commission




<http://www.seaturtle.org/tracking/>

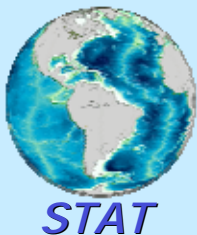


Terms of Use

Click through screen on public website



The screenshot shows a Microsoft Internet Explorer browser window displaying the seaturtle.org website. The address bar shows the URL: http://www.seaturtle.org/tracking/?tag_id=16180. The website header features the seaturtle.org logo and navigation icons for ImageLib, Maptool, Tracking, Mail, Members, News, Links, Search, Help, and Donate. Below the header is a menu with links to MTN, Symposium, Directory, Bookstore, Resources, and Partners. The main content area is titled "Satellite Tracking" and includes a "Sign In" button, a "Tracking Home" section with links to "Adoption Program NEW", "For Researchers NEW", "For Teachers NEW", and "Tracking FAQ NEW", and a "Partners" section with an "Animal Finder" search box. The "Terms of Use" section is highlighted, containing the text: "By accepting this document and using SEATURTLE.ORG the user agrees to the following:" followed by three numbered points. At the bottom of the Terms of Use section are radio buttons for "I DO NOT Accept" and "I Accept", and a "Submit" button.



<http://www.seaturtle.org/tracking/>



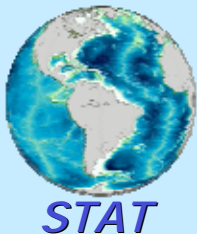
Education and Outreach

Tracking website

More than 2 million hits
since July 2003
~5,000 hits a day
Visitors from 144 countries
More than 715 individuals
registered to receive daily e-
mail updates

Helps to educate the public
about individual projects
and sea turtle issues

Encourages collaboration



seaturtle.org - Satellite Tracking - Mozilla Firefox

http://www.seaturtle.org/tracking/

seaturtle.org

ImageLib Maptool Tracking Mail Members News Links Search Help Donate

MTH Symposium Directory Bookstore Resources Partners

Welcome MichaelE

Sign Out

Tracking Home

Adoption Program **NEW**

For Researchers **NEW**

For Teachers **NEW**

Tracking FAQ **NEW**

Partners

Animal Finder

Projects

Olive Ridley Turtles - Thet Islands, Australia 2005

British Virgin Islands leatherback turtle

EVI Leatherback -

Anguilla's first satellite tagged leatherback A TUKOT project

Not yet named

Seabird Predation on Fishes in the Columbia River Plume

Elowahka -

Tough Guy -

Satellite Tracking

Adopt-a-Tracked Animal **NEW**

Animals tracked: 509

Animals on website: 200

Datasets shared: 104

Maximum time at-large: 701 days (Lofton's Lass)

Total data points: 233274

Welcome to Satellite Tracking at SEATURTLE.ORG. The goal of this program is to provide marine animal researchers with an easy-to-use tool for collecting, managing and sharing their satellite tracking data in near real-time.

Below, you will find a list of projects participating with SEATURTLE.ORG in this program. You will find links to background information about each program and the animals they are tracking, including maps that are updated daily.

Satellite Tracking Projects on SEATURTLE.ORG

Loggerhead Turtles: Bald Head Island 2004
Cape Verde (Cabo Verde) 2004 : Loggerhead Turtles
Cayman Islands 2004
Newport Aquarium Loggerhead Release 2004
Northern Cyprus
Anguilla's first satellite tagged leatherback A TUKOT project
British Virgin Islands -leatherback turtle
2003 South Carolina Satellite Telemetry Project
Loggerheads in the Adriatic Sea
VIMS Sea Turtle Research Program
Juvenile Green Turtles in NW Florida II
Olive Ridley Turtles - Thet Islands, Australia 2005
Loggerhead Turtles in Greece

<http://www.seaturtle.org/tracking/>

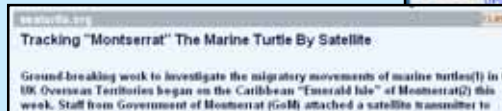


seaturtle.org

Popular Media

Generate tangible outputs

Satisfy the "reptiles"!



RESOURCES

Turtles on the Go

After being outfitted with a satellite transmitter last July, Fluffy, a female loggerhead (below), swam more than 4300 kilometers up and down the North Carolina coast before the transmitter failed in January. Enthusiasts and researchers alike can learn more about satellite tracking of turtles at this site from the nonprofit organization Seaturtle.org. You can download charts of the wanderings and photos of individual animals that researchers are following as part of 10 projects around the world. The site also offers tools and advice for scientists, such as software for making Geographic Information Systems maps and summaries of different tagging methods. For example, plastic or metal flipper tags are cheap and easy to attach, but they can fall off and might snag in fishing nets.

www.seaturtle.org

Send site suggestions to netwatch@aaas.org. Archive: www.sciencemag.org/netwatch

SCIENCE VOL 304 7 MAY 2004 803

NATIONAL GEOGRAPHIC
REPORTING OUR WORLD DAILY

Front Page > Home

Satellite-tracked Turtles Survive Hurricane Isabel

James Owen in England for National Geographic News September 25, 2003

Shelby had been reported missing, presumed dead, after Hurricane Isabel struck the eastern U.S. coast last week. Feared washed up or drowned, she is one of 11 female sea turtles being tracked by researchers keen to discover where they go after laying their eggs on land.

But Shelby, a loggerhead turtle, survived the storm. Having been fitted with a satellite transmitter while on Bald Head Island in North Carolina, her signals have since been picked up again near Virginia Beach.

The story of Shelby's voyage, plus those of ten other tagged turtles, have captivated a worldwide audience, with Internet users able to chart their daily progress towards far-off feeding grounds by logging on to Seaturtle.org

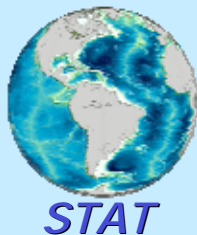
Sea Turtles

Samia, Shelby, Myles and Fluffy are all loggerhead turtles. But we know a lot more about them than most that they have satellite tracking units glued to their shells. They were all tagged by Brendan Godley and colleagues while nesting on the Eastern shores of the USA and the Cayman Islands in the last couple of months. Since then, Samia alone has clocked up more than 1300 Kms of travel. But where are they now and have they survived Hurricane Isabel which struck near their nesting grounds at the weekend? Anyone can now follow their movements on the Internet.

The technology to track them was developed at NERC's Sea Mammal Research Centre at St Andrews University by Prof Mike Fedak and colleagues. He's also using it to track Grey Seals around the UK. Some of them swim incredible distances from a very young age and seemingly purposefully. How do they

"For me science isn't a subject, it's a perspective. There are fascinating scientific aspects to everything from ancient history to the latest gadgets, outer space to internet decorating, and each week on The Material World we try to reflect the excitement, ideas, uncertainties, collisions and collaborations as science continues its never-ending voyage into the unknown."

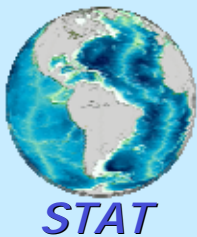
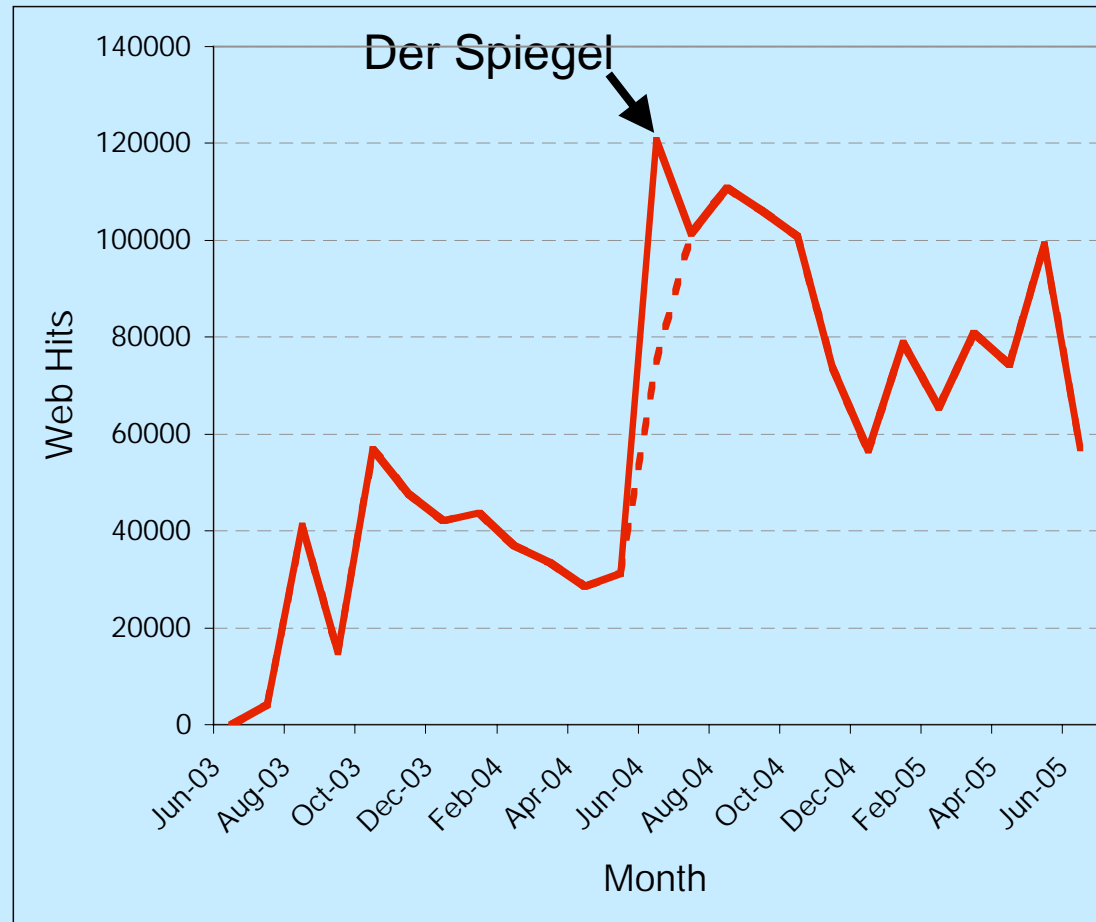
Quentin Cooper



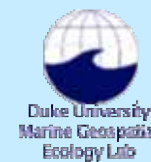
<http://www.seaturtle.org/tracking/>



Media Response



<http://www.seaturtle.org/tracking/>



Data Sharing for Education

Select a Turtle:

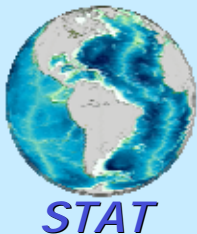
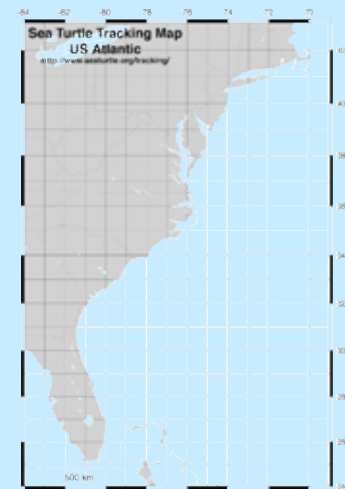
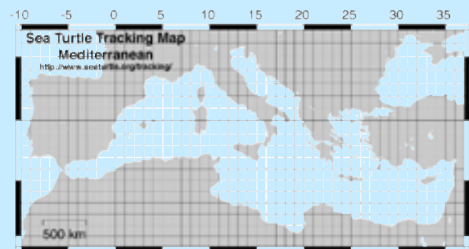
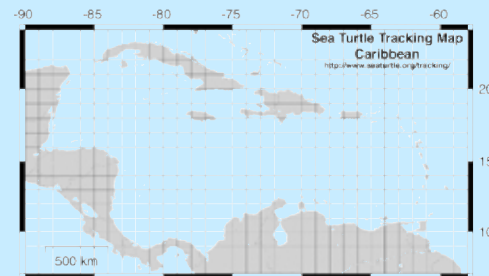
Celia - Green Turtle - Northern Cyprus 2003

For classroom use only! DO NOT DISTRIBUTE!

Visit this turtle's [tracking page](#) for background information.

Date	Longitude	Latitude	
2003-07-12	33.5	35.3	release
2003-07-11	33.5	35.3	
2003-07-13	33.5	35.3	
2003-07-14	33.4	35.3	
2003-07-15	33.5	35.3	
2003-07-16	33.5	35.3	
2003-07-17	33.5	35.3	
2003-07-18	33.5	35.4	
2003-07-19	33.3	35.4	
2003-07-20	33.5	35.4	
2003-07-21	33.5	35.3	
2003-07-22	33.5	35.3	
2003-07-23	33.5	35.3	
2003-07-24	33.4	35.3	
2003-07-25	33.4	35.3	
2003-07-26	33.5	35.3	
2003-07-27	33.5	35.3	
2003-07-28	33.5	35.3	
2003-07-29	33.5	35.3	
2003-07-30	33.5	35.3	
2003-07-31	33.5	35.3	
2003-08-01	33.5	35.3	
2003-08-02	33.5	35.3	
2003-08-03	33.5	35.3	
2003-08-04	33.5	35.3	

Grade-school teachers can request access to a simplified version of tracking data that individual programs have agreed to share.



<http://www.seaturtle.org/tracking/>



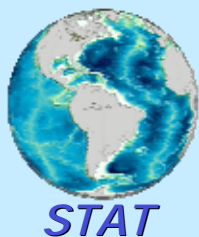
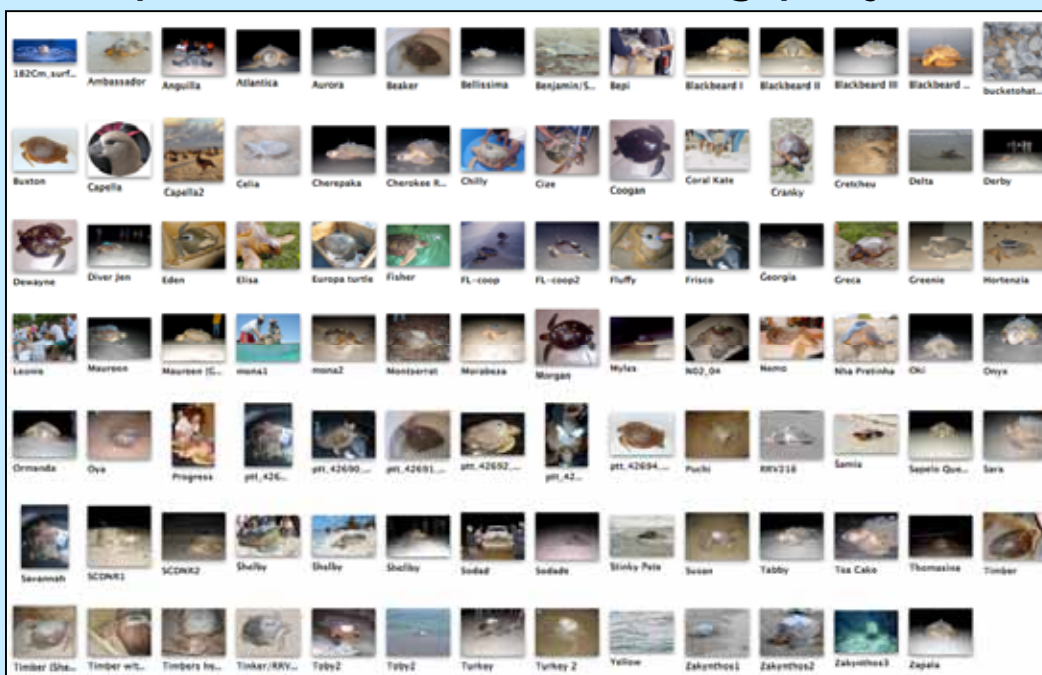
Adoption Program

Individual animals tracked on the public website are eligible for adoption

Half of all proceeds are passed to the tracking projects

To Date -
600+ adoptions

\$27,000+ raised



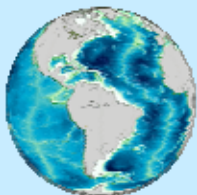
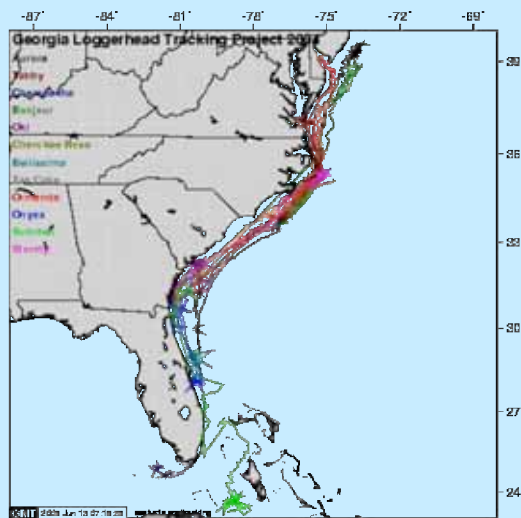
<http://www.seaturtle.org/tracking/>



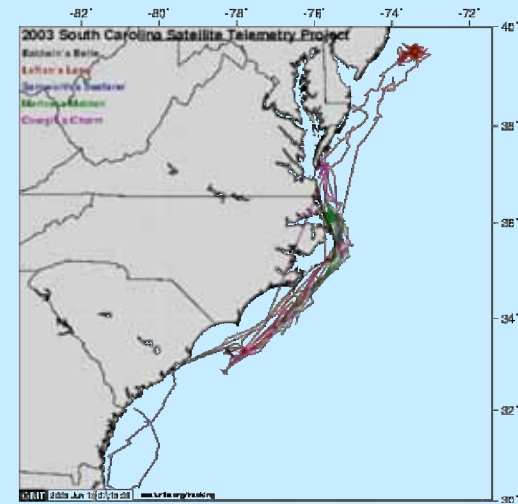
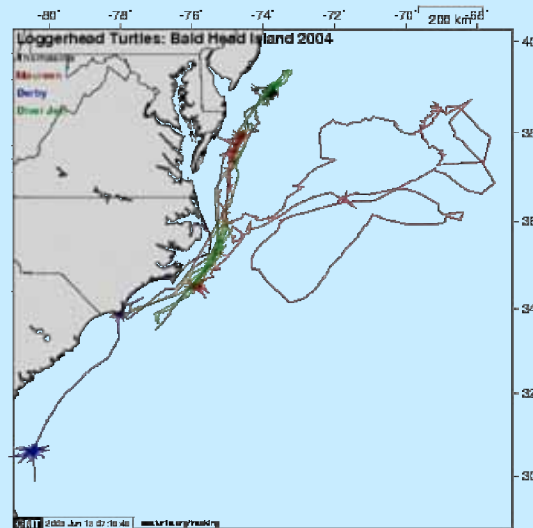
Collaboration

STAT listserv

Colleagues can follow your work



STAT



<http://www.seaturtle.org/tracking/>



Global Bathymetry

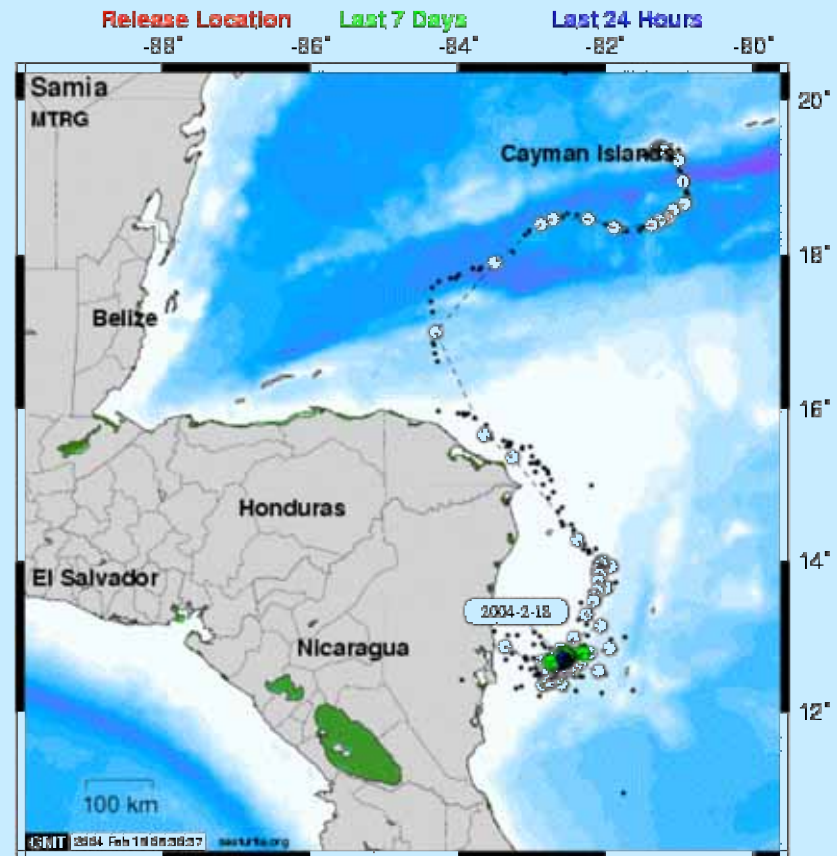
GEBCO

British Oceanographic Data Center

1 minute spatial resolution

Bathymetric values under each Argos location are extracted from the GEBCO data set and inserted into the STAT database

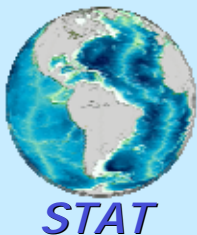
ETOPO2 also available
NOAA/NGDC



Distance Traveled: 3611 km

Straight-line Distance: 732 km

Green and Loggerhead Turtles: Cayman Islands 2003
Cayman Islands Department of Environment
& Marine Turtle Research Group



<http://www.seaturtle.org/tracking/>



Sea Surface Temperature

GOES SST (NOAA)

From 30°W to 180°W

45°S to 60°N

6km spatial resolution

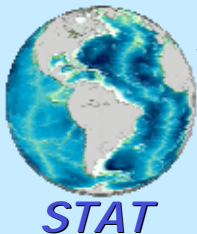
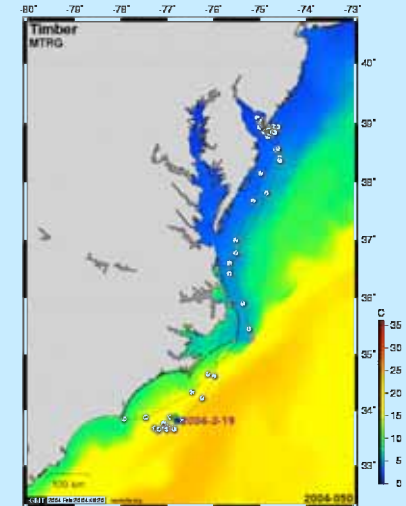
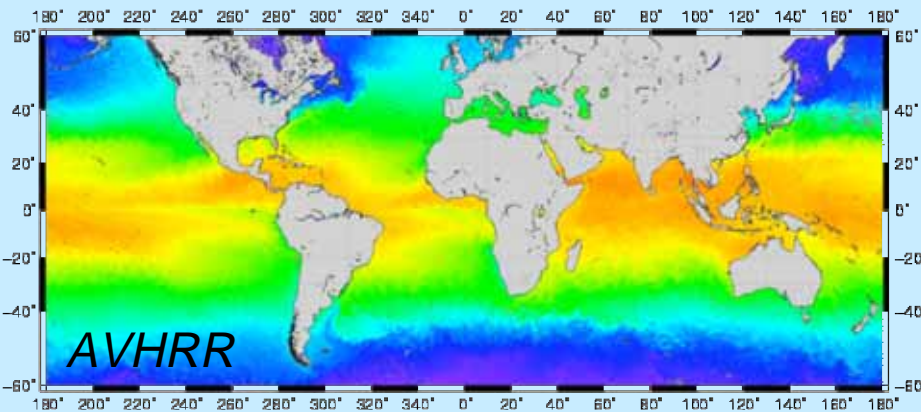
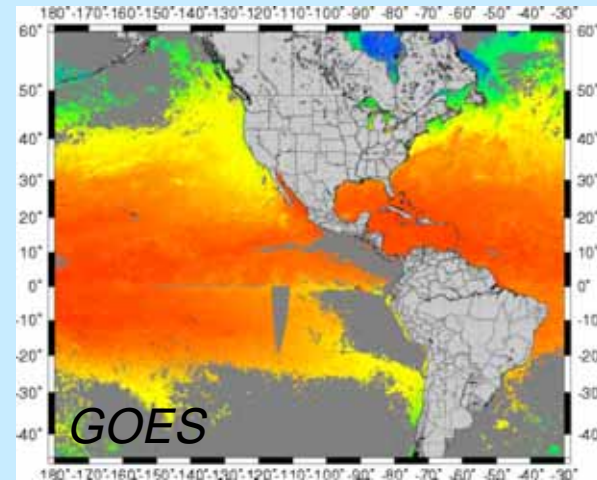
Daily temporal resolution

AVHRR (GODAE/US Navy)

Global

5km spatial resolution

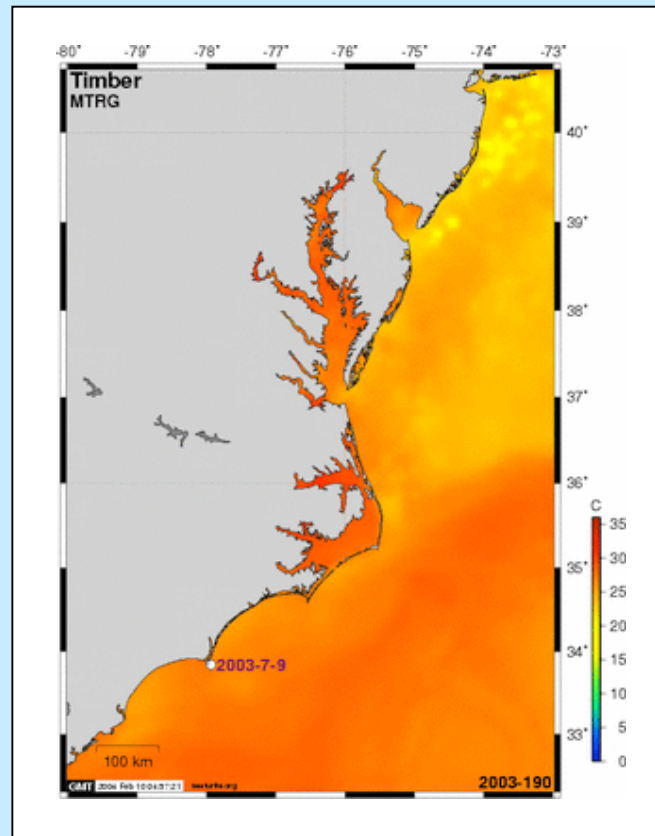
Weekly and monthly temporal resolution



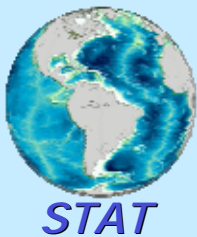
<http://www.seaturtle.org/tracking/>



SST Animation



Loggerhead Turtles 2003: Bald Head Island Project
Marine Turtle Research Group
University of Exeter in Cornwall



<http://www.seaturtle.org/tracking/>



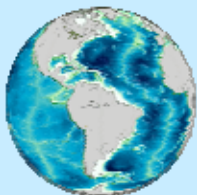
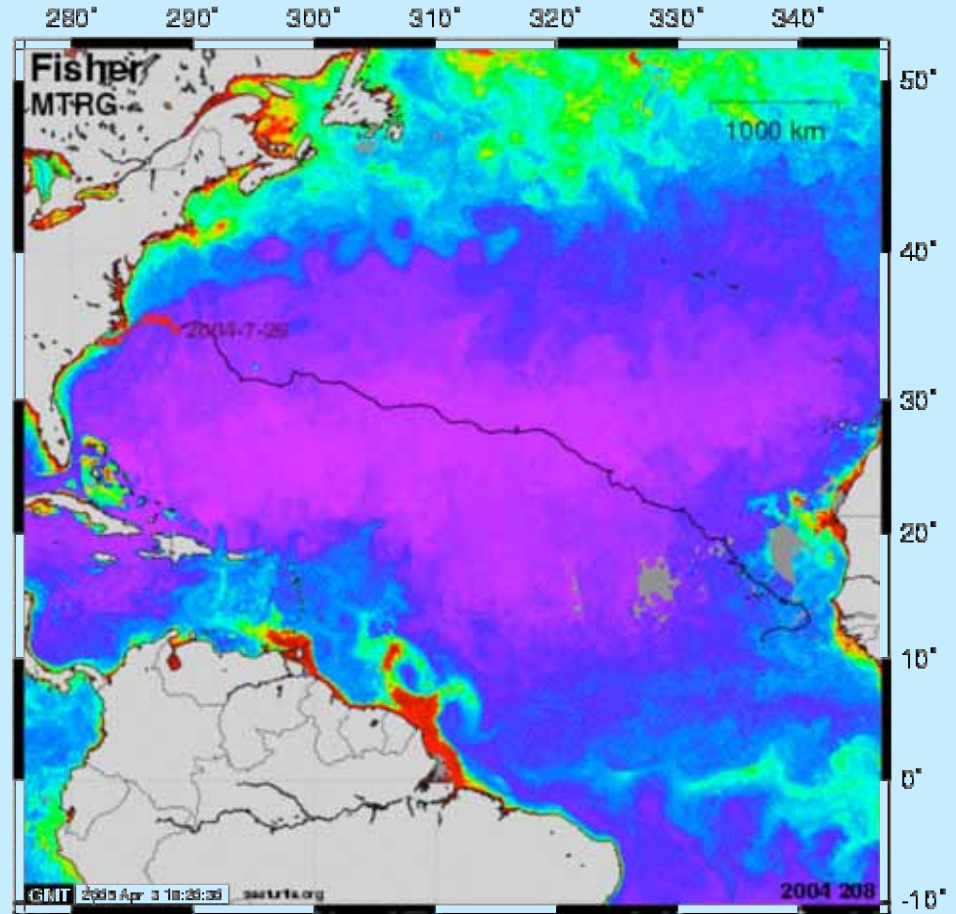
MODIS/SEAWiFS Chlorophyll

MODIS

Global
2002 to present
4km spatial resolution
Weekly and monthly

SEAWiFS

Global
1998 to present
9km spatial resolution
Weekly and monthly



STAT

<http://www.seaturtle.org/tracking/>



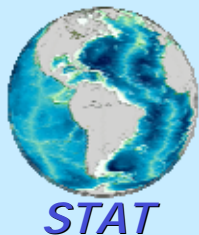
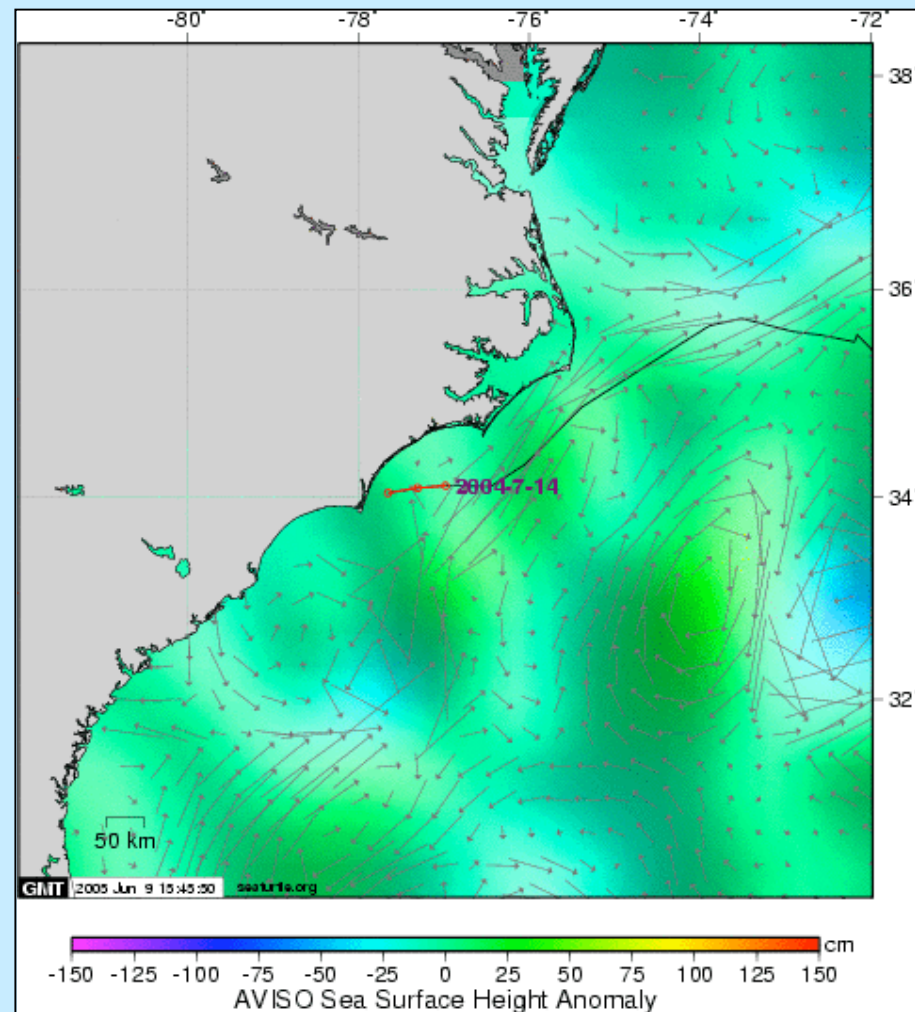
seaturtle.org

Geostrophic Currents and SSH

AVISO merged data product
Currents, ssh and ssha
Global
1998 to present
1/3° spatial resolution
3.5 day temporal resolution

"I could not have hoped to extract data for SST, chla, slope, gradient and slope gradient direction. I may have been able to get bathymetry data, but I would have struggled"

Bradley Page
La Trobe University

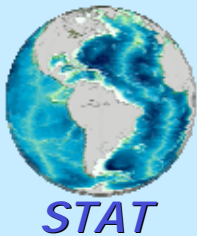
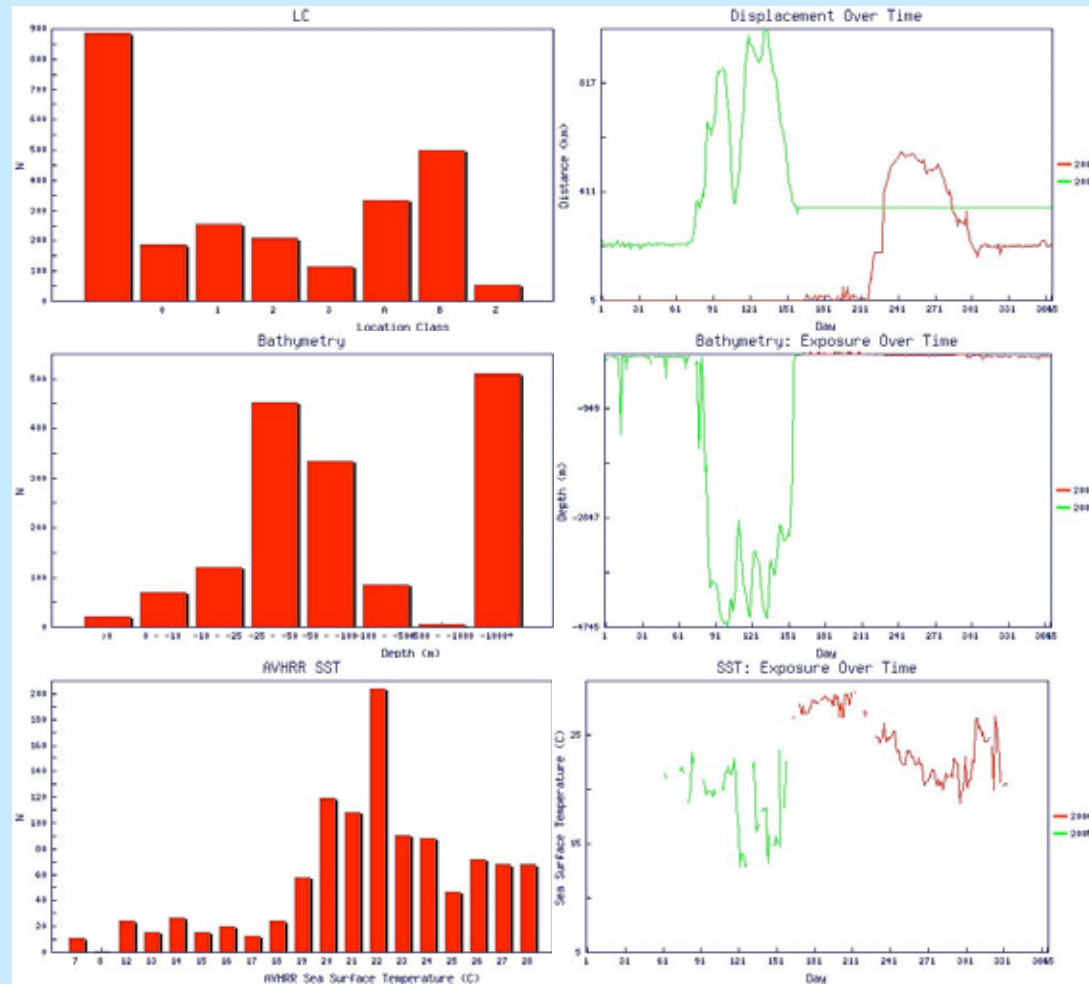
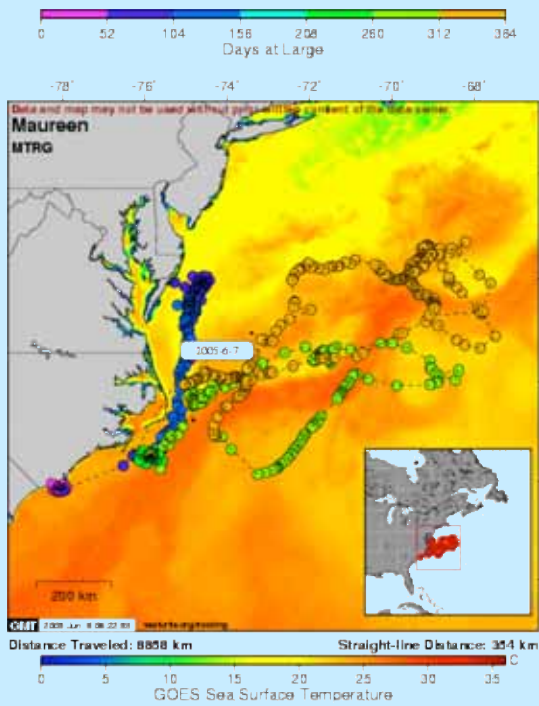


<http://www.seaturtle.org/tracking/>



seaturtle.org

Data Summary

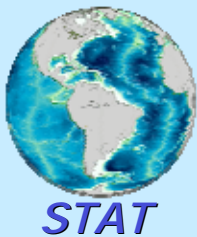
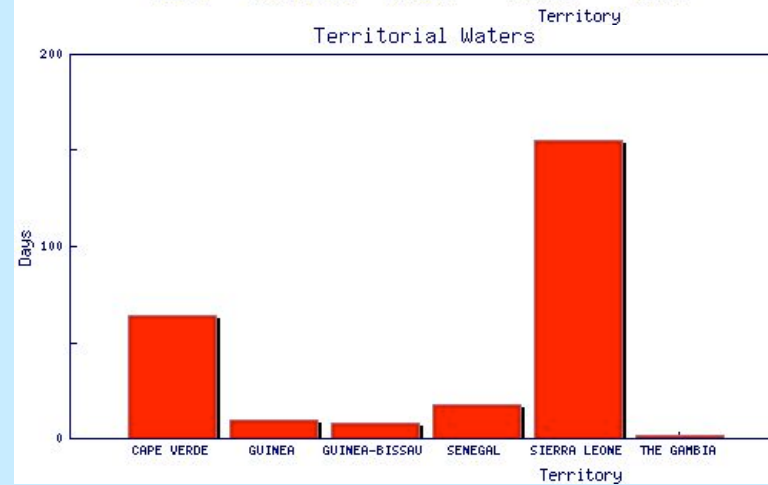
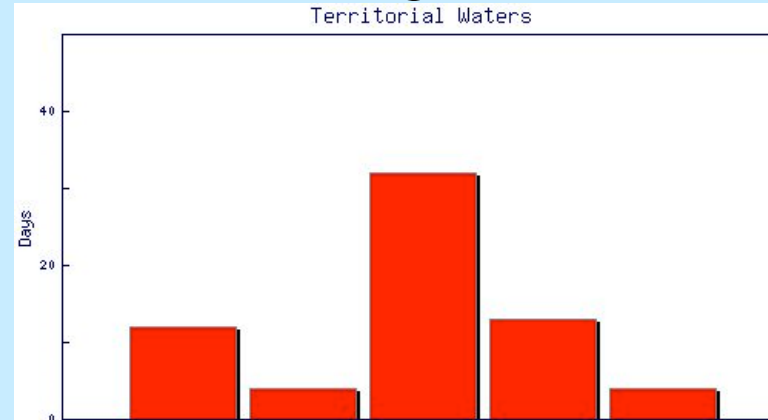
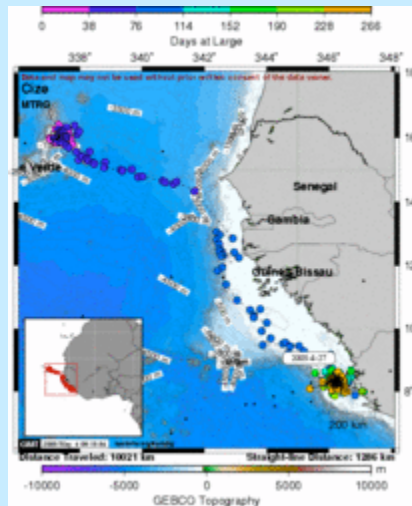
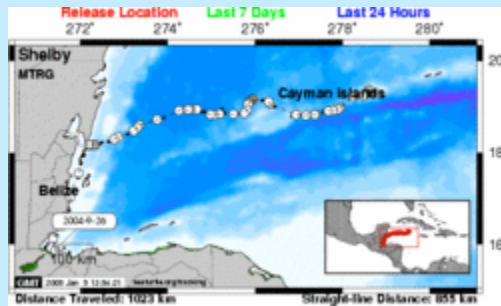


<http://www.seaturtle.org/tracking/>



Geopolitics

Geopolitical unit sampled for each Argos location



<http://www.seaturtle.org/tracking/>



Current Status

STAT is currently being used by 36 organizations around the world.

Academic, non-profit, governmental and commercial

43 projects available online

522 tracks in the database

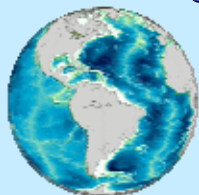
207 tracks available online

Multiple taxa represented

Sea turtles, dugongs, seals, sea birds, vultures, whale sharks and more...



© Peter Richardson/MCS

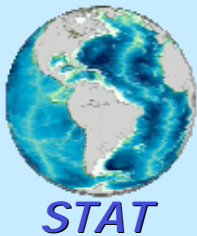
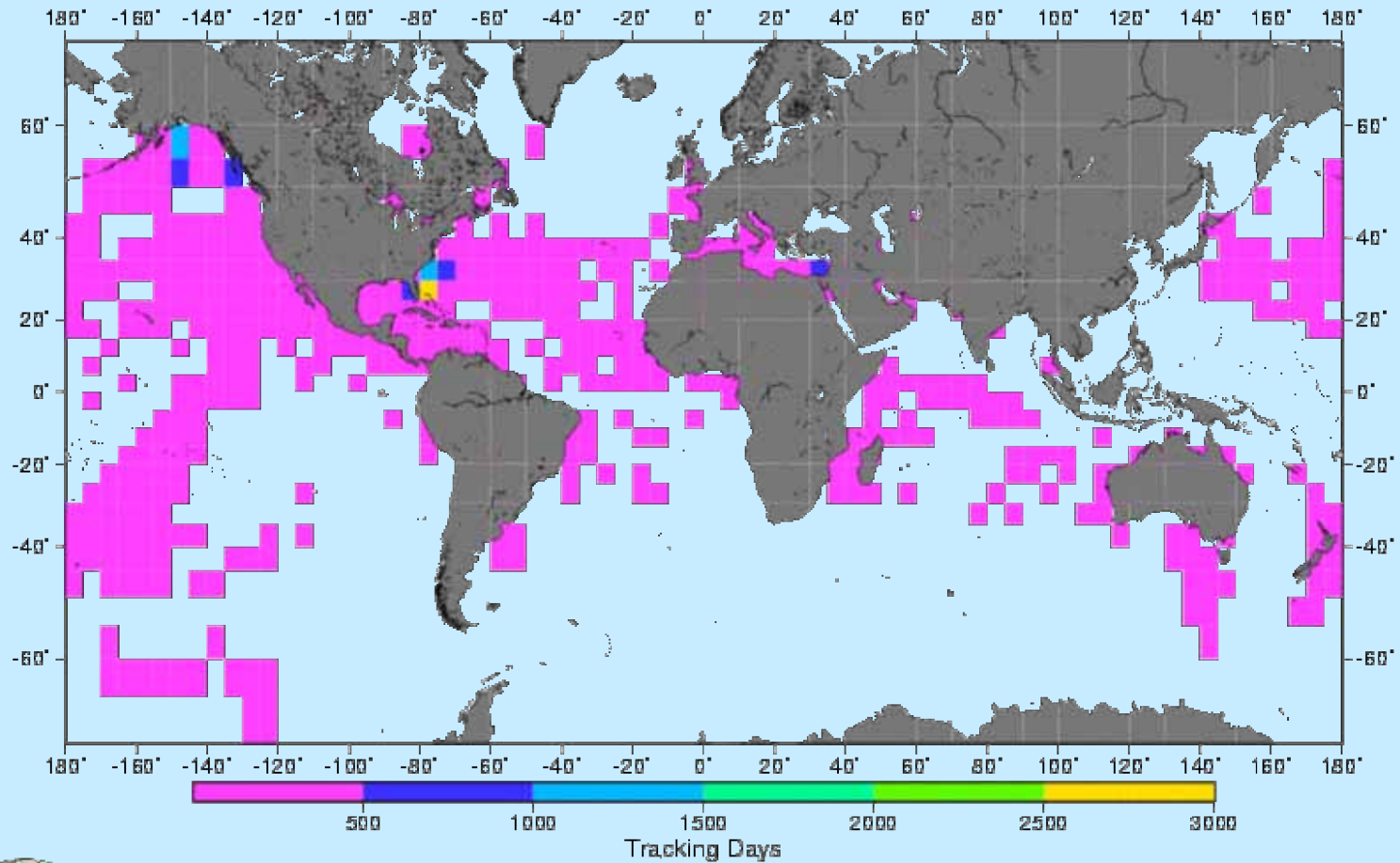


STAT

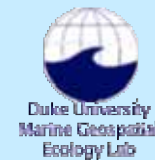
<http://www.seaturtle.org/tracking/>



STAT Tag Distribution

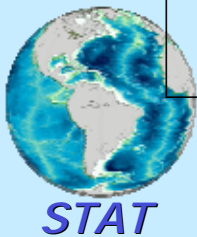
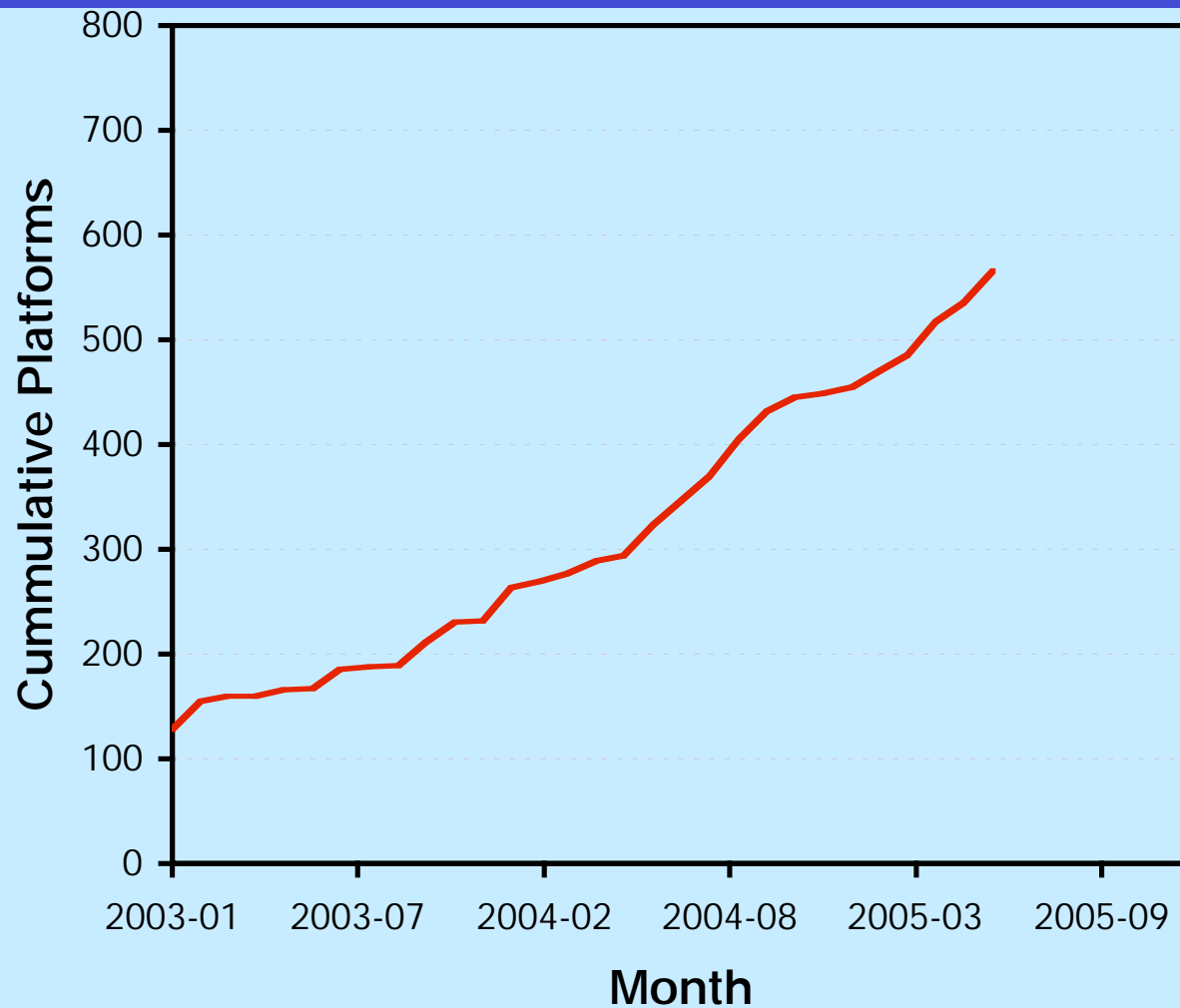


<http://www.seaturtle.org/tracking/>



seaturtle.org

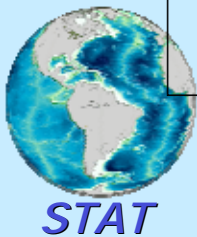
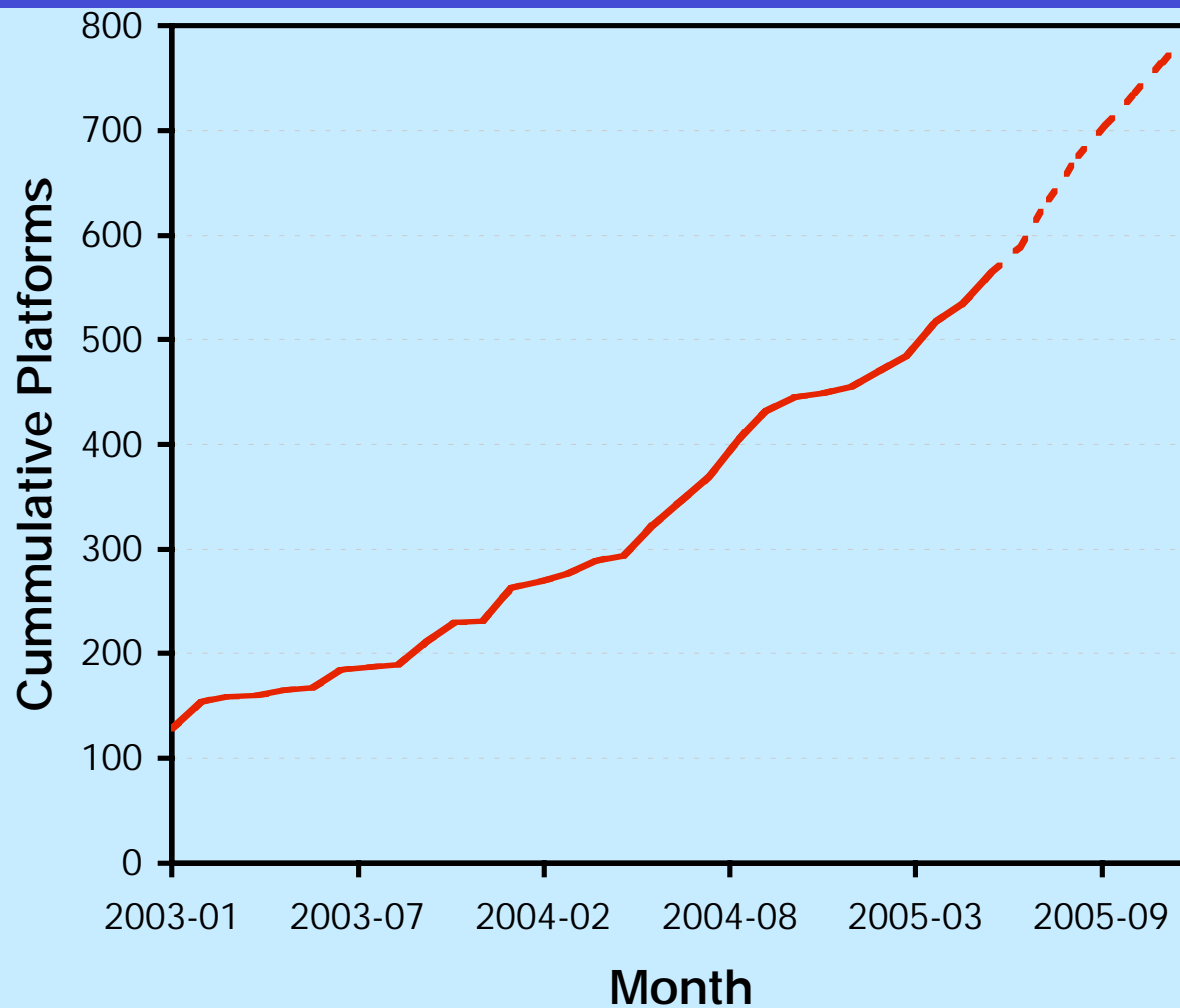
STAT Utilization



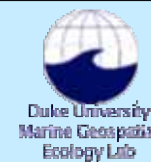
<http://www.seaturtle.org/tracking/>



STAT Utilization



<http://www.seaturtle.org/tracking/>



seaturtle.org

The Future

Currently seeking funding for future development

Continue quest for new data layers (especially terrestrial-based !)
Land reflectance, vegetation indices, suggestions welcome!

Derived data layers

Bathymetry gradient, frontal zones

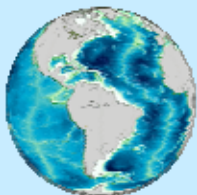
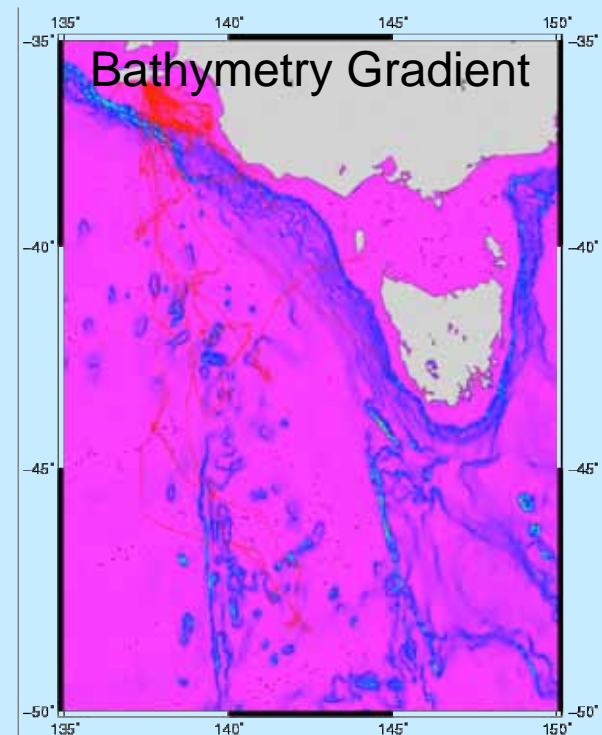
More analytical tools

Home range, Spatial stats, first passage time

Interactive visualization and smart filtering

Metadata support and data clearing house

OBIS, GODAE



STAT

<http://www.seaturtle.org/tracking/>



seaturtle.org

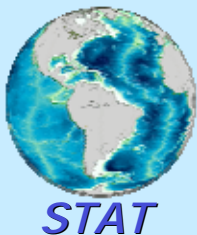
Summary

OPEN TO ALL TAXA
FREE !!!

Great resource for sharing information about your project
Fundraising - Outreach - Education

Integrated data management, backup, filtering and export
in standard formats

Value added data, analysis and summary functions
Speed - Distance - SST - Bathymetry - More!



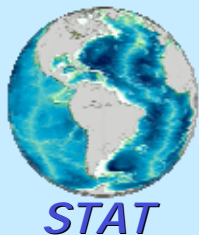
<http://www.seaturtle.org/tracking/>



Thank You!



ARCHELON, the Sea Turtle Protection Society of Greece
Banyan Tree Resorts Marine Lab
Biomarine International
Blue Ocean Institute
Charles Darwin University
Conservation Biology, University of Berne, Switzerland
Dubai Turtle Rehabilitation / Release Project
Duke University Marine Laboratory
Florida Cooperative Fish & Wildlife Research Unit
Georgia Department of Natural Resources
Islameta Group, Dept. of Ethology, Ecology, Evolution - University of Pisa
Karen Beasley Sea Turtle Rescue and Rehabilitation Center
Kelly Tarltons Underwater World Marine Turtle Rehabilitation Project
La Trobe University Sea Mammal Ecology Group
Marine Research Foundation, Sabah, Malaysia
Marine Turtle Research Group, University of Exeter in Cornwall
MCS-Seychelles
Moss Landing Marine Lab
Mote Marine Laboratory
Murdoch University
NC Aquariums
New England Aquarium
NMFS National Marine Mammal Lab
NMFS Office of Protected Resources
NPS Padre Island National Seashore
Oikonos
Projecto Tamar
Sea Turtle Conservation Bonaire
SCDNR Marine Turtle Conservation Program
South Carolina Marine Resources Research Institute
TAMUG Sea Turtle and Fisheries Ecology Research Lab
Texas A&M University at Galveston
University of British Columbia-Marine Mammal Research Unit
University of Puerto Rico Turtle Tracking Program
VIMS Sea Turtle Research Program
WWF Australia



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