

# Cruise track data from ship's underway data acquisition system collected during R/V Atlantis cruise AT18-14 in the Eastern Mediterranean; 35.3 N 21.7 E in 2011 (DHAB Metazoans project)

Website: <https://www.bco-dmo.org/dataset/3587>

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## Project

» [Investigations into the Physiological State of DHAB Metazoans](#) (DHAB Metazoans)

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## Dataset Description

Longitude, latitude, date and time (UTC) (XYT) cruise track data were subsampled from the ship's underway sampling system (daily WHOI Athena \*.CSV files of 1 minute ) using a BCO-DMO perl script. The underway data acquisition system records the best quality navigation data from several satellite systems: (2) Northstar 941 XD differential GPS, Furuno 1850 GPS, C-Nav dynamic GPS and Furuno GP-90D WAAS/dGPS.

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## Data Files

File
<b>cruise_track.csv</b> (Comma Separated Values (.csv), 13.45 KB) MD5:850316ff93c436b3c96c32ffcd46cb30
Primary data file for dataset ID 3587

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## Parameters

Parameter	Description	Units
cruise_ID	Cruise_ID	dimensionless
date	date (UTC) as YYYYMMDD	dimensionless
time	time (UTC) as HHMM	dimensionless
latitude	latitude (positive is North)	decimal degrees
longitude	longitude (negative is West)	decimal degrees

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## Instruments

<b>Dataset-specific Instrument Name</b>	Global Positioning System Receivers
<b>Generic Instrument Name</b>	Global Positioning System Receiver
<b>Generic Instrument Description</b>	The Global Positioning System (GPS) is a U.S. space-based radionavigation system that provides reliable positioning, navigation, and timing services to civilian users on a continuous worldwide basis. The U.S. Air Force develops, maintains, and operates the space and control segments of the NAVSTAR GPS transmitter system. Ships use a variety of receivers (e.g. Trimble and Ashtech) to interpret the GPS signal and determine accurate latitude and longitude.

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## Deployments

**AT18-14**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58732">https://www.bco-dmo.org/deployment/58732</a>
<b>Platform</b>	R/V Atlantis
<b>Start Date</b>	2011-11-25
<b>End Date</b>	2011-12-08
<b>Description</b>	<p>According to the pre-cruise plan, the two main science objectives are: (1) water column sampling at two basins: Discovery and Urania Basins, at 3 depths: brine (approx 3500-4000m depth), halocline (~3500m), and reference (~2000m) using a new sampler, the SID-ISMS (under construction), with the vessel CTD/Niskin rosette as backup and (2) sediment coring at both basins, using ROV Jason. Cores will be collected in 3 locations for each basin, the "bathtub ring" where the halocline impinges on the seafloor, the brine, and a reference core sample from above the halocline. Station "Discovery" (35° 19.213' N 21° 41.351' E) will be occupied for 6 days as will "Station 2" (35° 13.674' N 21° 28.58' E). The proposed science activities include: (1) water column sampling using the SID-ISMS to collect in situ filtered water (ship must hold position during deployment while instrument is working) and preserved in situ for molecular work; (2) water column sampling using the SID-ISMS to collect in situ filtered and preserved samples for FISH/microscopy experiments; (3) grazing experiment using SID-ISMS to collect water from halocline of each basin and measure the grazing rates of protozoa over a 6 hour period. The instrument must remain at depth during the 6 hour SID-ISMS grazing experiments. The sampler can be lifted to ~3000 m depth to get it away from the bottom, but the ship must maintain position to avoid dragging the sampler; (4) coring of "bathtub ring" at each basin using the ROV Jason that will be used to locate the bathtub ring and then collect cores at that location; (5) coring of brine at each basin (ROV Jason will reach into the brine from the bathtub ring area and will collect cores). Corers will be a combination of large Jason pushcores (property of co-PI Bernhard) and also some RNAlater samplers (similar to those used by Tim Shank (WHOI). The RNAlater samplers must be fabricated (and perhaps some borrowed from the Shank lab group); and (6) coring of a reference sample from outside the halocline (above) at each basin (normal seawater sediments). The research team aboard the R/V Atlantis, headed south on 25 November 2011 from Piraeus (port of Athens, Greece), to the study areas about 100 miles west of the island of Crete. No cruise report will be submitted for this cruise, but the science party did maintain a blog at the Dive and Discover site for Dive and Discover Expedition 14 - The Mediterranean Deep Brines (URL: <a href="http://www.divediscover.who.edu/expedition14/index.html">http://www.divediscover.who.edu/expedition14/index.html</a>). During the cruise, 5 ROV Jason dives, 10 SID-ISMS deployments, 1 multicorer (no samples recovered), and 3 Niskin rosette casts were completed. Image data from the ROV Jason dives for the AT18-14 cruise are available from the WHOI ROV Jason Virtual Van by clicking the year 2011 on the page's left side panel, and then clicking on the link for AT18-14. The cruise was supported by NSF-BIOLOGY awards: <a href="http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0849578">http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0849578</a> (Edgcomb) <a href="http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1061391">http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1061391</a> (Bernhard) Original cruise data are available from the NSF R2R data catalog</p>

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## Project Information

### Investigations into the Physiological State of DHAB Metazoans (DHAB Metazoans)

**Coverage:** Eastern Mediterranean; 35.3 N, 21.7 E

Invasion of the Body Snatchers!

Description text from the NSF award abstract:

Although it has been known for many decades that metazoans inhabit anoxic habitats either on a periodic, transient, or semi permanent basis, none have been shown to complete an entire life cycle without access to oxygen. The remarkable recent observation that loriciferan metazoans complete a full life cycle without access to dissolved oxygen raises questions in the fields of physiology and evolution. The habitat from which the anaerobic animals were collected is sediment from a Deep Hypersaline Anoxic Brine (DHAB) in the eastern

Mediterranean Sea at a water depth greater than 3 kilometers. DHABs are one of the most extreme marine environments known to science, with a water chemistry considered anathema to eukaryotic life. While the possibility of anaerobic metazoa is exciting, there are other potential explanations that warrant investigation before biology textbooks are rewritten. One alternative scenario is that remnant metazoa bodies were inhabited by anaerobic bacteria and/or archaea.

The overall goal of this project is to determine if the dominant loriciferan and nematode taxon in each of three DHABs represent living populations. Because remnant DNA can be preserved in anoxic settings for long periods of time, the project will include in situ preservation for RNA analysis. Further, because there is also some chance of RNA preservation in these anoxic sedimentary environments, the study will include analyses of the more ephemeral mRNA and also Transmission Electron Microscopy (TEM). On three ship days added to a funded cruise to sample DHABs for other purposes, an ROV will be used to preserve samples in situ. The specific aims are to: (1) Use RNA and DNA analysis to establish if metazoan ribosomal RNA and functional genes were active at the time of in situ preservation in the dominant two metazoan taxa from each DHAB. (2) Identify the prokaryotes associated with DHAB metazoans using RNA analysis and FISH/CARD FISH. (3) Assess the state of cellular ultrastructure in metazoans using TEM to determine the state of organelles (e.g., nuclei, Golgi, hydrogenosomes) and if DHAB metazoans have specialized cellular structures.

Regardless of results, significant information will be obtained. If the metazoans are not living in the DHABs, then a paradigm shift is unnecessary and physiology text books do not need to be rewritten. If the metazoans are living in the DHAB, then a paradigm shift is required.

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## Funding

Funding Source	Award
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-1061391</a>

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