CRUISE REPORT

S-214-215 Leg 3

SCIENTIFIC ACTIVITIES UNDERTAKEN ABOARD THE

SSV Robert C. Seamans

Tahiti, French Polynesia – Nuku Hiva, Marquesas, French Polynesia– Oahu, HI, USA

13 February – 21 March 2008

SEA sails its millionth nautical mile aboard S-215. Photo courtesy of J. Morton.

Sea Education Association
Woods Hole, Massachusetts
To obtain unpublished data, contact the SEA data archivist:
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Ship's Complement for SSV *Robert C. Seamans S-215*

**Scientific Staff**
- Gary Jaroslow, Chief Scientist
- Lynn Asbeck, First Assistant Scientist
- Patrick Curran, Second Assistant Scientist
- Elizabeth Burakowski, Third Assistant Scientist

**Nautical Staff**
- Chris McGuire, Captain
- John “Jack” Morton, Chief Mate
- Chris Duda, Second Mate
- Juliette White, Third Mate
- AJ Johnson, Engineer
- Heidi Miller, Assistant Engineer
- Tia Leo, Steward

**Students**
- Krystle Anderson, University of Arizona
- Chelsea Apito, Roger Williams University
- Sphia Bahlkow, Northeastern University
- Michelle Belfield, Maryland Institute College of Art
- Laura Bramley, Carleton College
- Riley Burch, Cerro Cosso Community College
- Megan Cook, Oregon State University
- Meghan Couet, Loyola College
- Laura Duffy, College of Charleston
- Alexandra Fioretti, Connecticut College
- Alexandra Fitzgerald, State University of NY, Maritime College
- Julia Haines, University of Chicago
- Alan Han, Dartmouth College
- Emily Hewitt, Wellesley College
- Elizabeth Koch, Carleton College
- Thomas Neilson, Colorado College
- Daniel Saxe, Brandeis University
Data Description

This cruise report provides a record of data collected aboard the SSV Robert C. Seamans during Cruise S-214-215 Leg 3 during February – March of 2008. The cruise track transected the central Pacific Ocean from Tahiti, French Polynesia to Oahu, HI with a port stop at Nuku Hiva, French Polynesia (Fig. 1). The sea-going program is an extension of Sea Education Association (SEA) courses conducted for six weeks on shore in Woods Hole and emphasizes the application of theoretical concepts to the study of the oceans. Oceanographic research conducted during Cruise S214-215 Leg 3 involved extensive data collection for individual student projects (Table 1) and ongoing SEA research programs. The student projects focused on current scientific problems in physical, chemical, biological, geological, and environmental oceanography, and stressed the interdisciplinary nature of the applied science. In particular, the complex interaction of oceanic processes was emphasized by interdisciplinary, regional, and temporal comparative analyses of the various data sets collected. Student research papers are available on request from SEA.

Permission to conduct oceanographic research within the territorial jurisdiction of the French Polynesia was most kindly granted by the Ministère des Affaires Etrangères et Europennes under Diplomatic Note No.:155/AME.

During the cruise, samples or data were collected at 200 discrete oceanographic stations (Tables 2 and 3) in addition to continuously sampling water depth, sub-bottom acoustic profiling, Acoustic Doppler Current Profiles (ADCP) and flow-through sea surface temperature, salinity and in-vivo fluorescence. This report summarizes sea surface chemical properties (Table 3), subsurface physical, chemical and biological characteristics (Fig. 2, Tables 4 and 5), and surface sediment qualities (Table 6). Lengthy CTD, CHIRP, ADCP and flow-through data are not reported here. All unpublished data can be made available by arrangement with the SEA archivist (Contact information, p.2). The information contained in this report is not intended to represent final interpretation of the data and should not be excerpted or cited without written permission from SEA.

Gary E. Jaroslow
Chief Scientist
S-215
Figure 1. Cruise-track map for Cruise S-214-215 Leg 3 of the SSV Robert C. Seamans from February 13 – March 21, 2008. The cruise began in Tahiti, French Polynesia (FP) with a port stop at Nuku Hiva, Marquesas, FP, and ended in Honolulu, HI, USA.
Figure 2. Data collected at CTD and surface stations located in map (lower left, stations shown by blue dots). Along-track hydrographic sections of water temperature, salinity, oxygen and in-vivo relative fluorescence (top and middle sections). Plot of water-column profiles of Colored Dissolved Organic Material (CDOM; lower right).
Figure 3. Acoustic Doppler Current Profiler data continuously collected along cruise track (blue line) located in map (lower left). East and North components of current speed along-track sections (top sections). Echo intensity amplitude along-track section (lower right).
Table 1. Student Research Projects

<table>
<thead>
<tr>
<th>Title</th>
<th>Student Researcher(s)</th>
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<tr>
<td>Variability in the Island Mass Effect as influenced by nutrient availability and surrounding reef topography</td>
<td>Alan Han, Julia Haines</td>
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<td>The dissolution of calcium carbonate due to ocean acidification</td>
<td>Ali Fioretti</td>
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<td>Island Mass Effect: eddies and secondary currents</td>
<td>Alexandra Fitzgerald</td>
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<td>The relationship between bioluminescence and chlorophyll-(a) distribution in the Equatorial Pacific</td>
<td>Chelsea Apito</td>
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<td>Diel vertical migration of zooplankton and its effects on myctophid population</td>
<td>Michelle Belfield, Riley Burch</td>
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<td>Bioluminescence and zooplankton abundance in the central Pacific</td>
<td>Laura Bramley</td>
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<td>Biophysical effects on the Deep Chlorophyll Maximum (DCM) in the central Pacific</td>
<td>Laura Duffy</td>
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<td>Zooplankton diversity, abundance and horizontal boundaries in the equatorial Pacific Ocean</td>
<td>Daniel Saxe</td>
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<td>Influence of Island-Mass Effect on zooplankton density and diversity in the South Pacific Ocean</td>
<td>Emily Hewitt</td>
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<td>Expectation of tuna distribution in the central Pacific based on environmental parameters</td>
<td>Elizabeth Koch</td>
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<td>Distribution of <em>Velella velella</em> and <em>Physalia physalis</em> in the central Pacific</td>
<td>Krystle Anderson</td>
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<td>Heterotrophic bacterial abundance and the oxygen minimum zone of the equatorial Eastern Pacific Ocean as influenced by nutrient and oxygen abundance</td>
<td>Megan Cook</td>
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<td>Effects of relative carbonate levels and grain size on submarine sedimentary slopes at island margins in the central Pacific</td>
<td>Thomas Neilson</td>
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<td>Horizontal distribution patterns of myctophid fish in the central Pacific during a La Niña year</td>
<td>Sophia Bahlkow, Meghan Couet</td>
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### Bathyphotometer Casts

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<td>33 km W of Makatea</td>
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<td>9°05.3' S</td>
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<td>S215-053-BP</td>
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<td>S215-061-BP</td>
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<td>2 km SE of Ahe</td>
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<td>S215-081-BP</td>
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<td>145°53.9'</td>
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<td>N Equat. Countercurrent</td>
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### CalCOFI Nets

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<td>24 km SW of Makatea</td>
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<td>S215-006-CN</td>
<td>15-Feb-08 1621 176.8</td>
<td>15°55.9' S</td>
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**Phytoplankton Samples**

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**Tucker Trawl**

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*sampled underway using filtered flow-through system*
Table 3. Surface station data.*

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Table 4: Neuston tow data. Locations given in Table 1.
Table 5. Hydrocast station data. Locations given in Table 1.*

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<td>0.980</td>
</tr>
<tr>
<td>10</td>
<td>38</td>
<td>1.154</td>
</tr>
<tr>
<td>11</td>
<td>15</td>
<td>0.914</td>
</tr>
<tr>
<td>12</td>
<td>14</td>
<td>0.811</td>
</tr>
</tbody>
</table>
Table 6: ARGO Float deployment sites

<table>
<thead>
<tr>
<th>ARGO Float</th>
<th>Date</th>
<th>GMT Time</th>
<th>Latitude</th>
<th>Longitude (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3056</td>
<td>07-Mar-08</td>
<td>0436</td>
<td>0°07.4’ N</td>
<td>144°57.7’</td>
</tr>
<tr>
<td>3059</td>
<td>08-Mar-08</td>
<td>1653</td>
<td>2°43.9’ N</td>
<td>145°39.7’</td>
</tr>
</tbody>
</table>

*Blank spaces = no data collected.*