

Education & Outreach – IODP 345 expedition – Final Report

Introduction

There have been three education officers on board the JOIDES Resolution for expedition 345. Susan Gebbels, a research associate from the School of Marine Science and Technology, Newcastle University (UK), Jean-Luc Berenguer, science teacher in International Highschool and Geoazur E&O team leader in Valbonne Sophia Antipolis (France) and Nicole Kurtz, an artist from the US who works with informal education settings creating pieces that focus on the necessity of art in the scientific discovery. This diverse group of people has been able to contribute a wide range of skills to the education and outreach remit of the expedition which has been greater than the sum of their individual parts.

Pre Cruise

Prior to the cruise the following initiatives were carried out:

- Contact was made with all the schools in the NE of England and France. Schools were invited to participate in the ship to shore broadcasts. Some newspapers and TV have announced the project.
- All the French and UK schools that signed up had a pre expedition presentation to prepare the students for the live broadcast and to meet the education officer.
- A special blog was created in French in the academic schools network (www.ac-nice.fr/svt/hdc) to follow the IODP 345 expedition.
- The National Space Agency in France (CNES) was contacted to get the opportunity with IODP 345 expedition to launch a drifter from the JR to study the currents in the Pacific area.
- The information received from the schools around the world that wished to participate in the broadcasts was collated and written up into a central spreadsheet. A calendar of broadcast events was made.
- An animation introducing the main scientific objectives of the expedition was created and posted on YouTube.
- Expedition 345 Trading Cards were made in association with contacts from the Girl Scouts of America. These cards were used for the first broadcast on board and highlighted each scientist.
- Preparations for J-aRt Contest 2013 were made. The contest this year was updated to include interactive guidance from Nicole Kurtz while on board. Tutorials were posted on the blog to give contestants tips and tricks for their Styrofoam sculptures.

Communication.

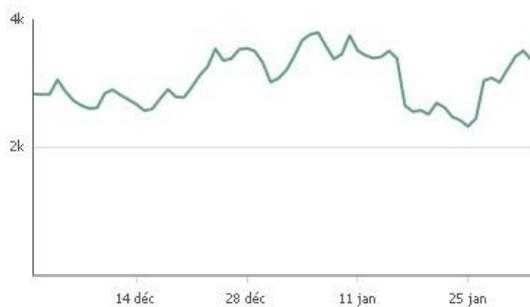
During the cruise, articles were published: in Newcastle Universities online newsletter, 3 local UK newspapers, and 2 French newspapers. The expedition was also publicized on French regional television. Art communities located in Northeast Ohio were contacted as well, with newsletters sent out from the Cleveland Institute of Art and Lake Erie College. Science Centers and other informal education institutions also followed the expedition in detail, posting updates in their online newsletters.

Joides Resolution web site

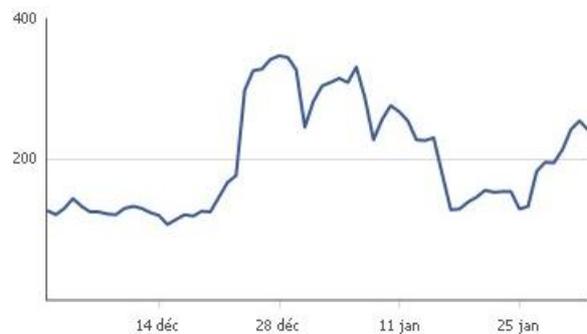
Daily post on JOIDES resolution blog. ~300 readings per post.

Facebook / Twitter

- Daily post during IODP 345. Stats below



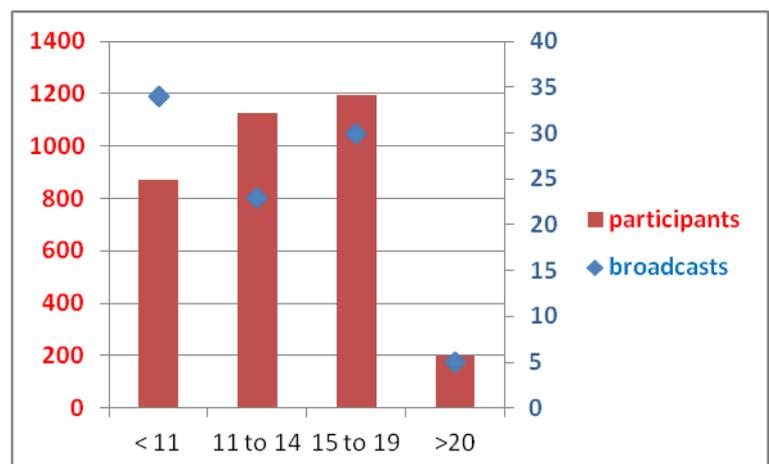
Peoples following JR pages (facebook)

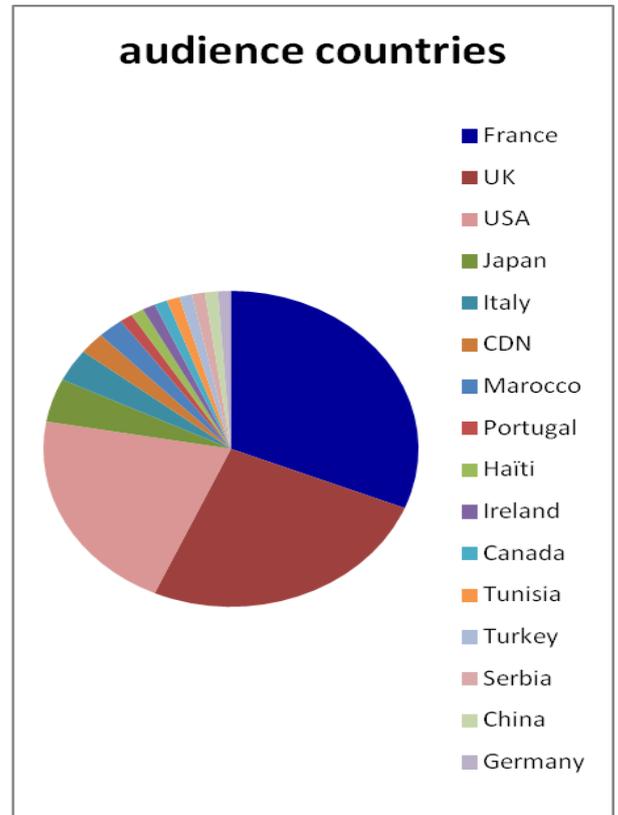
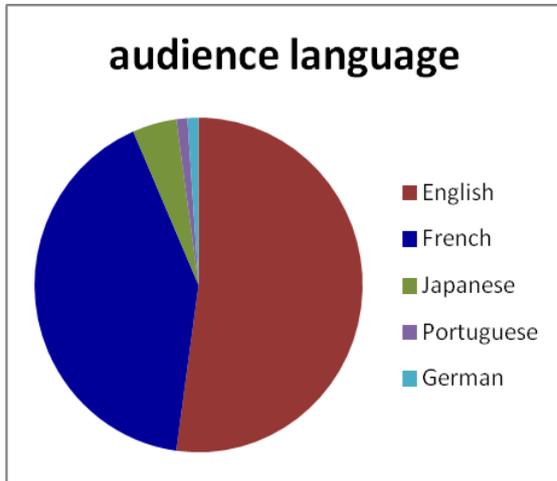
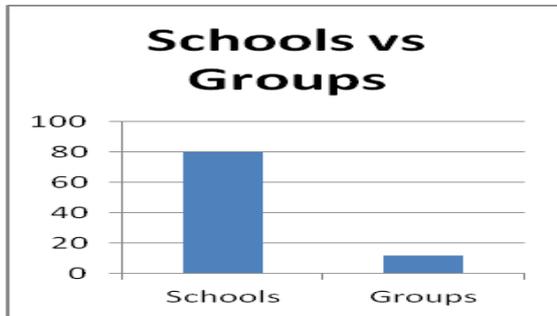


People speaking about JR posts (facebook)

Broadcasts schedule for schools

93 broadcasts, to 3800 pupils in 16 countries were delivered during the expedition. These lasted between 40 minutes and one hour long depending on the age of the students.





Educational practical activities

➤ *Cross Curricula workpackages.*

7 workpackages have been developed during the expedition. They cover a range of topics including Arts, Science and English. They are linked to National Standards and targeted at different age groups. The packages are designed to be a complete resource so that a teacher who does not know anything about the subject can download a work package and deliver a class.

Forces and Physics work package – learning objectives

- An understanding of density, floating and sinking
- The concepts of buoyancy, surface area and surface tension.
- An understanding of the opposing forces involved in moving a boat horizontally and vertically through the water.
- Familiarity with the JR

Marine snow work package –learning objectives

- To understand the importance of marine snow as a source of food for deep sea animals.
- An appreciation of the role that up welling currents serve in the completion of the open oceanic food chain
- An awareness of the differences between organic and inorganic matter.
- Feeding relationships in an open ocean food chain.

Animals in the deep work package –learning objectives.

- To be able to identify at least 3 different animals found in the ocean
- To have an awareness that the ocean is a series of habitats not just one.
- To develop an awareness of the concept of adaptation to environment.

Hydrothermal vents work package – learning objectives

Students will become aware of:

- Where the main ridge systems of the world are.
- Where the main vent fields are.
- What a hydrothermal vent is.
- Which animals are associated with specific vents.

Wayfinding graphics work package – learning objectives

The students will become aware of the following categories of wayfinding signs.

- Orientation
- Destination
- Directional
- Situation and object identification

Materials work package –learning objectives

- Pupils will learn to sort objects on the basis of simple material properties.
- Pupils will find out how the materials are chosen for specific uses on the basis of their properties.

Word game work package – learning objectives

This includes a series of word games, crosswords and word searches based around the JOIDES Resolution and IODP

Eye spy game

This is an interactive observation game that younger students can play during the tour.

➤ ***Weekly geoscience enigmas***

10 enigmas about geoscience and in relation with Hess Deep Expedition were posted on the JR blog pages and the French blog (www.ac-nice.fr/svt/hdc)

School links

There have been links with Expedition 345 and schools in addition to the broadcasts. 7 schools in UK and 1 in France adopted Expedition 345 as the focus for a half terms work. Using the themes from the mission they developed a scheme of work that used a cross curricula approach focused around the JOIDES Resolution and the Hess Deep rift. The schools also sent their mascots to the Pacific with Susan Gebbels. She took weekly

photographs of them during the cruise as a means of explaining the scientific processes on board.

Drifter launched from the JR in Pacific Ocean

The French educational program 'Argonautica' from CNES (Space National Agency) gave us the opportunity to launch a buoy in the Pacific during 345 expedition. This drifter was followed by schools to study the currents in this area of the ocean.

Art, science, culture

- 2 Animations have been completed during the expedition that details the specific concepts and scientific objectives relating to the cruise.
- Expedition 345 Trading Cards
- Intro to IODP poster – explains the drilling process and what happens to a core when it comes on deck
- Wayfinding Activity and Lesson Plan
- Tutorials for art projects and Teacher Resources were posted on the blog
- Group Guides – posters that explain the different lab groups on board
- Observation vs. Interpretation Game performed with the scientists while on board
- Deep Sea Animal Poster and Trading Cards
- Marine Snow activity sheets
- Graphics for events while on board: 5K Fun Run, T-Shirts collaborations with scientists
- Conceptual Illustrations using thin section images and photomicrographs

Post-Expedition Plans

Art, science, culture

- Articles in newspapers and national media news reports, planed back to the Hess Deep. (March 2013) JLB
- Revisit the French and UK schools (five to ten) and give update on expedition (Easter 2013) SG and JLB
- Article in ECORD newsletter (April 2013) JLB and SG
- EGU Poster session EOS 2: Bringing the geosciences into the classroom: 'IODP-ECORD program seen by a science teacher' (April 2013). JLB
*GIFT is a workshop, inside EGU annual meeting, attended by 80 teachers from Europe
- Write articles for Creative Teaching and Learning and Learning and Teaching update (before Easter 2013) SG
- Give a talk about experiences at sea and Expedition 345 during National Science and Engineering week (March 2013) SG
- Trial all new workpackages during National Science and Engineering week. (March 2013) SG
- Prepare a poster for European Marine Science Educators Association conference (September 2013) J-L with SG

- Propose a experiment project in high schools in France and UK with samples (sand / sediments) from the Hess Deep (June 2013 – June 2014) JLB and SG
- Workshop in France: ‘Bring the ocean into the classroom with IODP/ECORD’. 3 days long workshop for teachers (x30) in France to present IODP/ECORD resources for teaching ocean geosciences : lectures, hands-on activities, cores replicas, samples from Hess Deep, E&O network. This workshop can be extended to European teachers with help of ECORD. (early 2014) JLB
- Broadcast in French (can be translated) posted on JR website and IODP France website. The broadcast was recorded on board the JR and simultaneously in a school during the Hess Deep. (June 2014) JLB
- Design a post cruise book (cookbook) that contains all the resources and enigmas developed during the cruise. NK with assistance from J-L B and SG (end 2014)
- Preparation and publication of a post cruise comic book that outlines the educational aspects of the expedition, (early 2014). NK with assistance from J-L B and SG
- Additional animations – interviews with the scientists were conducted while on board asking them to explain their roles in the labs. I will use the audio from the interview, and animate what was said. (June 2013) NK
- Lab Tech Interactive Game – a Flash Interactive game that allows the player to go through the steps of a Lab Tech from when a core comes on board to when it goes to the scientists. (2014) NK
- Gallery Shows that display the illustrations and artwork produced while during and post expedition that highlight the art and science connection. (September 2013) NK
- Museum exhibit displays with interactive kiosks centered on the theme of Observation vs. Interpretation. (2014) NK
- Workshop with local museums in Cleveland, OH for the camps and classes departments creating activities for children based on Expedition 345 and IODP. (August 2013) NK
- Expedition 345 picture book using dioramas created by scientists while on board. (May 2013) NK
- Illustrations of publications as needed by the scientists. (2014) NK
- Give a talk on Science and Art interactions and experience at sea Expedition 345 during Earth Week in US. (April 2013) NK

Comments

ICT links.

- In general the ICT technology worked well, however we were limited in the number of places that we could broadcast from. It would be beneficial to extend the range of the tour by having reception in the following places:
 1. The galley
 2. The bridge
 3. The moonpool.
- Most of the broadcasts were filmed with the iPad, it was light, easy to use and had good sound and visuals. It could be improved by the addition of an independent wireless headphone and microphone devise. We believe that a cover with handles for the iPad is available; this would be useful as at times we broadcast in heavy rain.

- We appreciated being able to ask for the entire bandwidth of the ship when necessary, ie when the connection was weak.
- We would like to formally thank the MCS team of Andrew Trefethen and Mike Hodge. They were endlessly patient and helpful. Thank you.

JOIDES Resolution Website links.

- Every effort was made to post a daily blog on the JR website but sometimes the length of time that it took to sign in to the relevant pages made this either an impossible task or one that took up to an hour! Also, once the page finally loaded, the formatting options were missing. Can this be improved?

General comments.

- We appreciated having office space and good computer facilities. The location of the office was valuable as many people passed by and spoke with us about the outreach programme. We used the wall opposite as a place to post feedback, the daily broadcast schedule and as a place to disseminate information to the scientists and crew.
- We printed off a monthly broadcast schedule and posted it on the information wall so that scientists could see when we were working and sign up for a broadcast interview slot.
- We benefited from the support of each other, having a team of three education officers allowed us to do more than the work of three people; we were greater than the sum of our individual parts. We recommend that at least two education officers sail on each cruise, especially if they have several languages between them as this widens the field of schools that can participate.
- We recommend at the beginning of the cruise the education team meet with the co-chiefs and select some samples/cores/thin sections that can be used in the broadcasts and shown to the wider public.