



Oceanides Project - from Venus to Neptune, oceanographic buoys

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With two teachers of French literature and technology, for three years, we have been organizing a project named "Oceanides Project" in collaboration with the Centre National d'Etudes Spatiales (CNES) that is the French government agency responsible for shaping and implementing France's space policy in Europe. The CNES Argonautica educational project makes actual oceanographic satellite data available to students with the purpose to promote the understanding of the oceans, their relation to environmental change and the effects on the living world. It is a chance for students to undertake a real investigation by taking part in scientific projects that make them aware of the major challenges facing humanity and what is needed to protect our planet. Moreover, this project is innovative because it combines technical, educational and scientific disciplines.

The students participating in the "Oceanides Project" build a buoy in order to study a current in the Mediterranean Sea: This buoy, called Venus, is handmade by students, who have built and calibrated the sensors by themselves, transmits data through the Argos satellite communication system and those data are sent back to CLS (an international corporation subsidiary, among others, of CNES) based in Toulouse. In Rodez, we receive the raw data and we build graphs and analyse the results. We have chosen to study the "liguro – provençal - catalan" stream: this current crosses the South of Italy, France, Spain then the North of the African coast and return between Sardinia and Italy. The data collected by the Venus buoy are compared with the data collected by the satellite Jason (for example the temperature of water and the depth of the waves).

The first experiment was launched at the 43rd parallel offshore Marseilles on Thursday, the 25th of November 2009. The results of the measurements indicate that the temperature undergoes big variations at the time the buoy is dropped into the water. Following the drop, according to expectation, the temperature indicated by the three sensors remained approximately constant around 18°C. However, on the following Friday at 3 hours PM a problem occurred: Within 2 hours, all the data changed suddenly. The analysis of the progress of the battery, indicated that the voltage dropped to 4,5 Volts at the end of hour 25 and 10 hours later a progressive fall of tension terminated the life of batteries.

We suspect that Venus was violently shaken either by a boat or by a wave. Then water came into the buoy and the intern sensor, probably drowned, stopped at 30°C (its temperature maximum). However, thanks to this experiment, we understood that it is difficult to be sure that our buoy can remain safely into the water for long times. To prevent any problem in the future, we will have to test more carefully the buoy set-up and work to make the buoy more resistant to mechanical shocks.

For this reason we are now building a new prototype called Neptune, which will feature several sensors: one for the strength of the waves, one for their amplitude. We also work on the exploitation of the data supplied by CLS in order to compare our data with the altimetry data given by Jason. We hope to be ready with Neptune in Spring 2011.

With the end of Venus, we were initially very disappointed. We learned that things may not work properly the first time they're built. We also had some big satisfactions when we studied the few data provided by Venus: results are explicit enough to be able to make conclusion, so there is hope for the second experiment by Neptune. This is the mystery of Science with its failure and success!