

Summary INSTM Report

Title of Project: Towards operational oceanography training and development in Tunisia
Host Institution: Institut National des Sciences et Technologies de la Mer (INSTM).
Visiting Professor: Prof. Vladimir G. Koutitonsky (Canada)
Period of Training: May - November 2007
Total Cost: \$113,359.31

Prof. Vladimir Koutitonsky from the Institut des Sciences de la Mer de Rimouski (ISMER), Université du Québec à Rimouski, Québec, visited the Institut National des Sciences et Technologies de la Mer (INSTM) in Tunisia for a period of six months to provide practical hands-on training in coastal zone observing systems, as well as providing a grounding in operational oceanography via a series of lectures.

His host and collaborator at INSTM was Prof. Cherif Sammari, head of the institute's Marine Laboratory. Training was provided to young scientists from various countries in North Africa, and more specifically from Gabon (1 student), Ivory Coast (1 student), Mauritania (1 student), Morocco (1 student) and Egypt (3 students). An additional 10 students from various institutions in Tunisia also attended the courses and a number of "observers" from the host institution INSTM sat in on the lectures every day.

Coastal oceanography is not taught at universities in Tunisia and coastal observations are not available at standards that are useful to national interests or international needs, so the training course filled a void and helped to address some of these issues. Prof. Koutitonsky being fluent in English, French and Arabic, he was ideally suited to teach such a group of international Arabic students. He gave a series of intensive applied lectures (in both English and French) focussing on the basic knowledge required to ensure a durable operational oceanography national programme. These lectures lasted some 156 hours (9 am to 1 pm every working day during 2 month) and covered three main topics:

- Coastal hydrodynamics (fundamental equations of motion, surface waves, tidal dynamics, storm surge dynamics, wind-induced circulation, upwelling);
- Time series measurement, analysis and prediction (EOF analysis, spectral and wavelet analyses);
- Practical 3D numerical modelling (setting up, initiating and forcing a coastal hydrodynamic model using the observed data), using the MIKE3 modeling system.



A first short research project involving all the students was initiated to monitor and model the circulation and sand transport in the Gulf of Gabes, a semi-circular gulf located along western side of the Sicily Strait in the Mediterranean. During one week, the students helped with the programming and deployment of tide gauges, which were purchased using funds from the Nippon Foundation (a total of four submersible tide-gauges as well as one Vaisala weather station were purchased). Data from the tide gauges was downloaded on a regular basis and the students carried out data analysis and data quality control. During the following three weeks, the students were shown how to set up a simple numerical circulation model so that that data they had just gathered could potentially be used in real-time.

A second longer term research project was then initiated at INSTM with the Tunisian students to measure and model the sea levels and currents in the Gulfs of Tunis (July-August 2007) and in the Gulf of Gabes (September-October 2007). INSTM staff and some students undertook several field trips in order to deploy and retrieve the tide gauges provided by the Nippon Foundation. The data retrieved is currently being analysed within several Masters degrees research theses.

Finally, real-time sea level measurements using the GSM transponders and tide and wave gauges provided by the Nippon Foundation to Tunisia are currently being deployed in the Gulf of Gabes for long-term sea level observations at two locations. To our knowledge, this is the first operational oceanography observational system deployed in North Africa.

Once completed, some of the resulting value-added products will be tidal predictions, water circulation and coastal erosion maps around the Gulf. These can be archiving in the GIS-based oceanographic database of INSTM. The data collected will also become part of a larger international effort to monitor coastal parameters in real-time along the Tunisian coastline.

The Visiting Professorship Programme acted to strengthen the interactions between INSTM and ISMER for future large-scale multidisciplinary measurement and modelling efforts to be undertaken in the Gulfs of Tunis and Gabes. The student reports at the end of the training period were of an extremely high standard, a testament to the dedicated teaching of the Nippon Foundation POGO visiting professor.