Ocean Turbulence: Synergy between scientific advancement and technological innovation

2 June 2017 FEUP - Departamento de Engenharia Eletrotécnica e de Computadores Room: I-105

Seminar Program

10:00 - 10:45	Welcome session and LSTS presentation António Sérgio Ferreira
10:45 - 11:30	Internal Waves: what's turbulence got to do with it? Jorge M. Magalhães DGAOT and CIIMAR, University of Porto
11:30 - 13:00	Robotic Ocean Turbulence Measurements Rolf Lueck Rockland Scientific International

Robotic Ocean Turbulence Measurements

Rolf Lueck Rockland Scientific International

Abtract

It has become progressively more practical to use autonomous vehicles, such as gliders, AUVs, vertical profiling floats and fixed mooring to make measurements of ocean turbulence into the dissipation range to obtain the rate of dissipation of kinetic energy — the primary parameter for characterizing mixing. This technical advance opens to door to global-scale and long-durtion measurements for assessing the role of the ocean in controlling climate, the study of water mass transformations and internal wave-driven mixing. I will review the technological developments and provide examples of the successful usage of robotic measurements to study the overflow of Atlantic Deep Water through the Faroe Strait, topographically-induced mixing and surface-layer turbulence.

Bio

Rolf has been involved in ocean turbulence measurements since 1971 when he was an undergraduate student working with Tom Osborn at the University of British Columbia in Vancouver. He completed his Bachelor of Applied Science in Engineering Physic in 1973 and his PhD in Physical and Oceanography in 1979. Since then he was a Research Scientist at the Naval Postgraduate School in Monterey California and the Johns Hopkins University in Baltimore. He was a professor of oceanography at the University of Victoria from 1990 to 2004. In 2005 Rolf co-founded Rockland Scientific International to promote ocean turbulence measurements by supplying state-of-the-art instrumentation, training and education. His company has now produced over 250 instrument systems that are being used world wide to measure ocean and lake turbulence.

Internal Waves: what's turbulence got to do with it?

Jorge M. Magalhães DGAOT and CIIMAR, University of Porto, Porto, Portugal

Abtract

Interfacial internal waves, the analogue of surface waves propagating along the oceans inner stratification, are ubiquitous features ranging up to several hundred meters in amplitude and propagating for several days along hundreds of kilometers. Being intrinsically nonlinear, they have a net transport associated with them, which means they carry both mass and momentum across great distances. In fact, internal waves are believed to play an important role in mixing including in maintaining the meridional overturn circulation, and that means they are turbulent phenomena. So let us investigate just how turbulent they really are.

Bio

Jorge Magalhães is a physical oceanographer and currently a post-doctoral researcher at the University of Porto (Ciimar). He's expertise involve mostly remote sensing of the sea surface and internal wave phenomena. Together with Professor Jose da Silva he has over a decade of experience in interpreting small-scale ocean phenomena using surface signatures acquired from airborne and satellite imagery.