

October 16, 2007

Position as “Early Stage Researcher” for
Wave climate changes in the Baltic Sea and their impact on coastal processes and ecosystems

available at the Institute of Cybernetics (IoC) at Tallinn University of Technology, Estonia

Whom we look for

IoC offers a position for a qualified person (MSc or an equivalent degree obtained not later than in 2004) with background in applied geophysics, applied mathematics, physics, or mechanics, and with extended experience in the coastal processes or surface wave matters.

The goal of the position consists in further understanding of the impact of changing climate conditions on wave activity and related changes in coastal processes and ecosystem functioning along downwind side of semi-enclosed basins. The work will be performed in cooperation with the recently launched analysis of long-term wave climate variations in the entire Baltic Sea.

The duration of the appointment is 18 to 24 months depending on available funds.

Skills

The successful candidate will work in the field of numerical analysis and statistics of wave conditions. A large part of the work form measurements of wave properties and field studies of the reaction of coastal processes and/or ecosystem to different wave conditions. He/she should have a good knowledge in surface wave theory, the basics of numerical methods, and certain computer skills. Experience of writing code in FORTRAN, Matlab or in similar environments as well as knowledge in coastal management issues is welcome.

Motivation

Recent studies have indicated a severe mismatch between changes of the overall wave activity (measured in terms of annual average of significant wave height) and the mean wind speed in the Baltic Sea Proper. This mismatch is not caused by changes in the dominating wind directions. Consequently, changes of certain other properties of the wind fields (e.g. the changes of duration of winds from different directions or shifts of trajectories of cyclones) govern the long-term variations of the wave fields. There is some evidence that the accompanying changes of wave fields combined with the increasing storminess have already caused extensive erosion and alteration of depositional coasts in the eastern Baltic Sea.

Owing to the complex geometry of the Baltic Sea, even small changes in wave properties may greatly influence the intensity of coastal processes and functioning of the local ecosystem in semi-sheltered areas (e.g. the Moonsund or the Gulf of Finland). These areas usually have a fragile ecosystem. Wave climate could also be a key factor governing the distribution of the bottom macrophytes and other features of intensively developing, high-energy beaches that may indirectly affect the global state of the sea through, e.g., changes of the fish spawning conditions and fish stock in general. Understanding of the role of wave activity in their functioning and their response to changing wave conditions is thus extremely important for sustainable development of the coastal areas and for the sea ecosystem in general.

The successful candidate is expected to carry on studies in selected coastal areas of the eastern Baltic Sea. The studies comprise: numerical simulation of wave fields based on a high-

resolution wave model and historical wind data, analysis of long-term wave statistics, field studies of wave properties, field works targeted to establishing the current status of local coastal processes and their potential reaction to changing wave conditions. Application of the obtained results for different coastal management issues is desirable.

The training of the candidate and the mutual interaction with the scientists from IoC in the general surface wave theory and coastal processes is expected; and training in methods of measurement and analysis of surface wave fields will be provided.

Institute of Cybernetics at Tallinn Technical University was founded in 1960 as an institute of Estonian Academy of Sciences and was associated with Tallinn University of Technology in 1997. The academic staff of IoC currently consists of 6 DSc, and the equivalent of 25 PhD. The institute hosts the Centre for Nonlinear Studies (CENS, Estonian Centre of Excellence in Research from 2003) that was founded in 1999 to promote interdisciplinary studies of complex nonlinear processes that stem from solid mechanics, fluid dynamics, fractality of nature etc.

Working group

The successful candidate will join the IoC-based SEAMOCS team – the group of water waves (led by Prof Dr Tarmo Soomere) within CENS. The team carries expertise in general wave theory, analysis of long transient waves, multi-nested modelling of wave conditions in areas with complex geometry, extreme wave matters, numerical wave modelling, wave and wind climatology, and the interaction of waves and coastal processes.

SEAMOCS (Applied stochastic models for ocean engineering, climate and safe transportation) is a Marie Curie Research Training Network financed by the EU. The initiative links meteorology and statistics with ocean and coastal engineering. The overall goal of research and training is increased marine safety and reduced capital and operational costs of sea transport and major off-shore installations. The consortium consists of three university research groups in ocean and coastal engineering, three university research departments in applied probability and statistics, and three public and private organizations engaged in activities to increase the safety of marine operations. The chosen candidate will have the opportunity to take part in courses and training programs offered by the SEAMOCS partners, and to take advantage of other SEAMOCS activities related to meteorology, statistics and marine safety. Resources are available within the SEAMOCS project for this exchange.

Formal requirements

One of the aims of the Marie Curie program is to promote mobility. To be eligible, the candidate must NOT have

- the nationality of the host country (here Estonia), unless he/she has been living outside of the EU and the Associated Countries for at least four of the last five years,
- lived and/or worked in that country for more than 12 months during the last three years.

Additional information

- For more information, please contact: Tarmo Soomere, +373-6204167, soomere@cs.ioc.ee
- If you are interested, please send your application letter, short description of the research plan, CV and 2 reference letters to Prof Dr Tarmo Soomere, Institute of Cybernetics at Tallinn University of Technology, Akadeemia tee 21, 12618 Tallinn, Estonia, or electronically to soomere@cs.ioc.ee
- Last day of application is 30 October 2007; starting date is 01 December 2007, at the latest.
- For citizens of non-E.U. or non-associated states, some restrictions apply.
- For information about IoC see <http://www.ioc.ee>
- SEAMOCS website: <http://www.maths.lth.se/seamocs/>
- Marie Curie opportunities website: <http://cordis.europa.eu.int/mc-opportunities/>