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MARINE CURRENT ENERGY SYSTEMS: ANALYSIS AND DESIGN

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ABSTRACT

The exploitation of tidal currents is at the forefront of technology maturation in the offshore renewable energy sector. The present challenge is to develop a next generation of energy harvesting systems characterized by a significant reduction of the cost of energy, increased safety, reliability and environmental sustainability over the full life cycle.
Disruptive innovation is necessary to design systems capable to demonstrate profitable operation also in operating conditions where existent technologies are not adequate. This includes for instance less energetic tidal sites and ocean currents.

Computational models describing the complex mechanisms governing operation and performance of hydrokinetic systems can provide powerful tools to adequately address fundamental aspects since the early stages of design, thereby accelerating technology assessment and reducing uncertainties.

This Invited Session aims to collect contributions reflecting the state-of-the-art of computational models addressing relevant problems in hydrokinetic systems analysis and design. Contributions may address a wide range of topics, such as:

- device hydrodynamics: performance, wakes.
- transient loads in service conditions.
- fluid-structure interaction.
- device/device interaction in arrays and clusters.
- coupled hydrodynamics, power conversion and control strategies.
- hydrodynamic design.
- hydrodynamics of innovative energy harvesting technologies.
- environmental impacts.

The objective is to provide an updated picture of the capability to simulate by computational modelling the complex conditions affecting device operations at sea, including those involving multi-disciplinary features. Contributions will highlight significant advancements, and will help to stimulate discussion on existing gaps and areas for further development.