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Tsunami Wave Propagation Forward and Inverse Simulation and Scientific Gateway Building for Disaster Mitigation

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Manila trench and Ryukyu trench are the two hazardous subduction zones which might cause disaster tsunami to South East Asia countries if a megathrust earthquake caused by any of the two trenches.

This EGI-Engage Disaster Mitigation Competence Centre aims to develop novel approaches of real-time tsunami simulation over the Grid and Cloud by COMCOT-base fast forward tsunami wave propagation simulation. Integration with rapid and correct rupture process solutions to make the tsunami simulation as accurate as possible is the first goal. By collaborating with tsunami scientists, the workflow and computing model are defined according to the case studies conducted by the user communities, and the iCOMCOT web-based application portal has been implemented. iCOMCOT is an efficient and low-cost tsunami fast calculation system for early warning by optimized and parallelized COMCOT in order to meet the requirements of real-time simulation.

Also based on the high performance COMCOT simulation by the iCOMCOT, the tsunami inverse simulation is developed to identify the best possibilities of historical tsunami sources according to the evidences at hand. Cases around Taiwan and the Philippine Sea Plate region were studied and supporting the analysis of potential tsunami sources. Based on the e-Science paradigm and big data analytics capability, the target to answer a much open question such as "which fault in what rupture process could cause over 1 meter wave height and 50 meter in-land inundation in Taiwan"could be also achieved in the future.

Links, references, publications, etc.

S.C. Lin, TR Wu and E. Yen, HY Chen, J. Hsu, YL Tsai, CJ Lee and P. Liu (2015), Development of the Tsunami Early Warning System for the South China Sea, Ocean Engineering, Ocean Engineering, vol.100, pp.1-18, May 2015.

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