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A study on the potential of Science Monitoring and Reliable Telecommunications (SMART) cable measurements for tsunami early warning in Indonesia

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The world oceans are traversed by more than a million kilometres of glass fibre communication cables and it is planned to equip the next generation of these cables with scientific sensors placed at the optical repeaters that are regularly spaced at intervals of 50km to 100km. An international joint task force (JTF) of three UN agencies (International Telecommunication Union, World Meteorological Organization, Intergovernmental Oceanographic Commission of UNESCO) coordinates the efforts to create the cost-effective Science Monitoring and Reliable Telecommunications (SMART) network. The SMART network would provide valuable real-time measurements for ocean climate and sea-level monitoring, other scientific fields, and in particular for earthquake and tsunamis observation and early warning.

For tsunami early warning, the SMART network would provide a considerably larger quantity of pointwise measurements of sea level height than DART buoys at much lower cost. However, the cable and thus sensor locations will mainly be determined by economic aspects and will follow the most cost effective route rather than the most interesting one with respect to the scientific measurements.

For two cable routes planned parallel and perpendicular to the Sunda Arc in the Indian Ocean, we will show how sea level measurements along the hypothetical sensor locations could improve the tsunami early warning for Indonesia by evaluating the tsunami scenarios computed in the framework of GITEWS (German Indonesian Tsunami Early Warning System, funded by the German Federal Ministry of Education and Research).