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Sea level changes as observed in the field and understood in terms of accumulated knowledge and physical laws

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The science of sea level changes is complicated and calls for deep knowledge in a number of issues and careful consideration of different forcing functions. Observational facts from the field must always be in the centre. There are no successful shortcuts to be found in simple statistics or modelling. A true sea level specialist must cover several different disciplines, and be well aware of the accumulated knowledge over time and the physical laws that set the frames and boundary of what can be considered reasonable and what must be dismissed as illusions. During the past centuries, the present and the near-future sea level changes have been and will be dominated by three main variables; glacial eustasy, thermal expansion and redistribution of water masses, all of which can be handled as to rates and amplitudes. Today, the contribution of ice melting and thermal expansion seems to be in the order of 1 mm/year (10 cm/cy). It surely has to be well below 10 cm/year (or 1 m/cy), which was the mean rate of glacial eustasy at the maximum rate of ice melting after the Ice Age. Thermal expansion may amount to 1 mm/yr in the open oceans, decreases with depth towards the coasts, and will always be zero at the shore. Redistribution of water masses (horizontal eustasy) is another prime factor. The present rate of sea level changes lies between ± 0.0 and $+1.0$ mm/yr (higher rates represent local effects or mistakes), and is likely to remain so for the next century.

Biography

Nils-Axel Mörner completed his PhD at Stockholm University in Sweden with postdoctoral studies at Western University in London, Canada. He was the Head of Paleogeophysics & Geodynamics at Stockholm University. He has published more than 500 papers in reputed journals and several books. He has presented some 550 papers at international conferences. He is a world expert on sea level changes.

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