Session: please mark your topic's session what you want to present your lecture.

A hypothesis - the 2021 physics Nobel prize significant for understanding the variability of marginal sea morphology?

Authors: Hans von Storch*
Affiliation: Institute of Coastal Systems, Hereon Research Center, Geesthacht, Germany, and Hamburg University, Hamburg, Germany, and
Ocean University of China, Qingdao, China
*** E-mail:** hvonstorch@web.de

Abstract:

A 2021 recipient of the Nobel prize in physics was Klaus Hasselmann, who was recognized "for the physical modelling of Earth's climate, quantifying variability and reliably predicting global warming.". Is there something to learn for marginal sea studies? It is hypothesized that this is so, with taking Hasselmann's seminal paper "Stochastic Climate models" from 1976 as point of departure. According to this "Brownian motion"-ansatz, short-term, unprovoked fluctuations cause long-term variations. Thus, any long-term change reflects a mixing of forced and unforced variability. Does this have significance of the variability of morphology in China's marginal seas? Recently it was shown that in such seas considerable small-scale variations, for instance related to eddies, internal tides, fronts and other phenomena, take place. It is hypothesized that these small-scale (and short term) processes act upon morphology dynamics, which will integrate these variations in the spirit of the "stochastic climate model" so that slow and regional-scale morphological changes emerge. Indeed, CNN reported after an accident with a submarine in the South China Sea: "Those waters' environment and the sea bottom are in a state of slow but inexorable change … It is an area that requires constant bottom contour mapping". In this talk, the stochastic climate model as well as the knowledge about small scale, unprovoked variability in the South China Sea and in the Yellow Sea are presented, and the resulting hypothesis formulated.

Keywords: Stochastic Climate Model, internal variability, hydrodynamic noise, South China Sea, Yellow Sea, morphological change**.**