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AI-Application for Scientific Sensor Data collected onboard German Research Vessels

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The Davis-SHIP-system (DSHIP) is designed to store and manage environmental and system data collected during expeditions of German research vessels. These data encompass a wide range of information, including physical and chemical parameters of seawater as well as data on weather conditions and other environmental variables. The DAM project "Underway"research data undertakes a scientific evaluation and provides the quality-controlled data of selected environmental parameters in a FAIR manner, openly accessible for re-use. Scientists can leverage these data to gain new insights into marine ecosystems, climate change, and other vital aspects of marine research. Quality control of the data sets can be time-consuming and subjective, when manual flagging needs to be applied, because "classic"quality-control routines struggle to adequately flag the data. To provide the user with data faster and of higher quality, we explore artificial intelligence (AI) approaches within the "Underway"research data project. As a first step, common features are examined with the help of AI in a wide suit of parameters stored in DSHIP. As a second step, we train an AI to obtain quality-controlled data from "raw"DSHIP data and compare the results to the classically quality-controlled data. These approaches aid in identifying patterns and trends within the data that may be of interest for scientific analysis and are a step to further automation of the quality control process.

Primary authors: SCHLUNDT, Michael; OELKER, Julia; KOPTE, Robert; WIEMER, Gauvain

Presenter: SCHLUNDT, Michael

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