ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

CRUISE-REPORT

FS Heincke – Cruise 469

Norwegian trench, Sognefjorden, Danish EEZ

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02.08– 13.08.2016

Scientific Participants

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[1] 02.08. – 13.02.2016

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Zusammenfassung

Hauptziel der FS Heincke-Expediton HE469 war der Test eines neuen drei-dimensional steuerbaren Schleppsystems, das als Trägerplattform für eine synergistische Integration von verschiedenen Sensoren- und Messgeräten dient. Das geschleppte Messsystem soll eine räumlich und zeitlich hochauflösende Untersuchung physikalischer, chemischer und biologischer Parameter im oberen Ozean ermöglichen.

Es wurden ausführliche Tests der Systemeigenschaften durchgeführt. Unter Veränderung der Flugparameter und variierender Seilnachführung in Abhängigkeit u.a. der Zuglast wurde ermittelt, wie zukünftig eine Verbesserung der Undulationsperformance im automatischen Modus durch Softwareanpassungen möglich ist. Nach Flugtests ohne Sensor- und Gerätebestückung, erfolgten Tests mit integrierter Messsensorik, darunter ADCP, Breitband-Echolotsystem Simrad EK80, CTD und optische Messsensorik (PAR, Ramses ACC VIS Radiometer,Transmissiometer, Fluorometer). Die Messungen mit der Messsensorik erfolgten für Testzwecke. Messungen mit dem schiffsgebundenen Breitband-Echolotsystem Simrad EK80 wurden ebenfalls für Testzwecke auf einigen Transitstrecken durchgeführt.

Main objective of the FS Heincke expedition HE469 was to test a new towed vehicle steerable in three-dimensions, which serve as a carrier allowing a synergistic integration of a set of sensors and instruments. This towed vehicle will allow surveying of physical, chemical and biological parameters in the upper ocean with a very high spatial and temporal resolution.

Extensive testing of the performance of the towed vehicle was performed. By modifying different flight parameters and spooling out and in the towing cable depending on e.g. the tensile load, it was investigated how e.g. the undulation performance of the system can be improved by means of software adaptations. After tests without integrated sensors, tests were performed with sensors and instruments mounted on the vehicle, among others with ADCP, Wide-Band Echosounder Simrad EK80 and optical sensors (PAR, Ramses ACC VIS radiometer,transmissiometer, fluorometer). Sensor measurements were conducted for testing purpose. Also for testing purpose, measurements with the ships mounted Simrad EK80 were performed during some transits.

Introduction and objective

Primary objective of the cruise was testing a new towed vehicle steerable in three-dimensions, serving as a carrier allowing a synergistic integration of a set of sensors and instruments, which will allow high-resolution measurements of physical, chemical and biological parameters in the upper ocean.

Study area

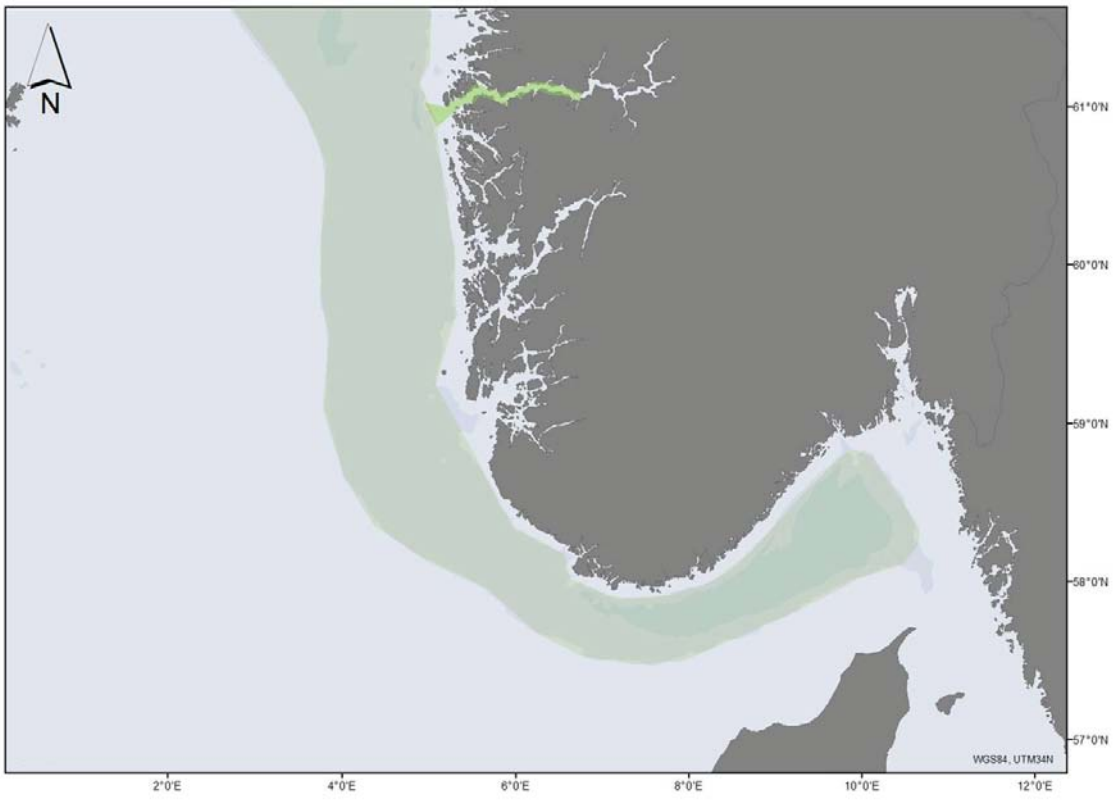

Chart of the geographical area of intented work marked in grey-green (Norwegian trench) and light-green (Sognefjord).

All tests of the performance of the towed vehicle were performed in Sognefjord (Norway). Port calls were in Bergen on 04.08.16 and 07.08.16 and in Esbjerg on 12.08.16, which serve embarkment and disembarkment of cruise participants.

Methods

Flight performance tests were conducted with different flight parameters. Tests of the undulation performance were made with manual support by spooling in and out towing cable in order to effectively increase undulation amplitude by flatten the increase in tensile load approaching the undulation maxima. Communication of the sensors and instruments mounted on the vehicle and control units on board the ship via fiber optic and performance of the instruments were tested for several hours, while testing flight performance with payload.

Preliminary results

Flight performance tests allow deriving a concept how to improve undulation performance of the towed vehicle in automatic undulation mode by means of software adaptations.