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Deep Water Exchanges in a Sill Fjord: A Stochastic Process

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ABSTRACT

A statistical theory for the behavior of a fjord system with a sill is formulated and leads to the establishment of conditional and marginal distribution functions for the homogeneous deep water density of the enclosed part of the fjord basin. From these frequency distributions, the probability functions for influx to the fjord basin are determined. Numerical solutions for these functions are derived on the basis that the external input is a Gaussian (normal) variate. Application of the theory is made to two Norwegian fjords with characteristic influx intervals from 3–10 years. The theory is also applicable to prognostic problems in connection with proposed engineering measures.

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