Geophysical Research Abstracts,
Vol. 10, EGU2008-A-00664, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-00664
EGU General Assembly 2008
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Seasonal and interannual changes in the Nordic Seas

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The Nordic Seas (NS) that included Norwegian, Greenland and Barents seas play an important role in the global climate system. They have a strong effect on the climate of middle and high latitudes due to unique location on the border between Atlantic and Arctic oceans. Interannual and long period changes of air-ocean interaction intensity in the NS have a direct impact on the global thermohaline circulation [Dickson et al., 2002], advection of temperature and salinity anomalies to the adjacent regions [Karcher et al, 2003], weather and climatic conditions of the Northern Europe and Arctic [Bengtsson et al., 2003]. One of the important directions in the investigations of climate dynamic is data restoring in the nodes of regular/irregular grid. A theoretical basis of the objective analysis (OA) that used for this task is concluded in the minimization of error functional by interpolation weights variation relative to any another set [Cressie, 1993; Isaaks, Srivastava, 1989]. An advantage of the kriging technology is the ability to estimate an interpolated value for regular or irregular grids and to provide an interpolation error. The interpolation error depends on stations spatial distribution and number of stations inside the correlation radii and computed as kriging standard deviation (KSD) divided by square root of number of measurements (N). Isotropic spherical model of spatial structural function (variogram) was used to generate the objectively analyzed (OA) monthly fields for all analyzed parameters (T,S,O2). The spatial correlation radii were varied in range 180-220 km and assumed to be constant during one month for all years. In the first release of OA fields we use an additional condition that at least seven measurements are necessary to produce probability estimation of interpolated parameters with significant reduction of interpolation error. The rather strong limitation let us to produce ‘true’ OA fields that can be used for anomalies calculations. Computing of the mean fields for different time interval

formally reduce the error of the mean due to increased number of measurements used for the value estimation. At the same time it inserts an uncertainty due to different physical processes contribute to the mean parameters fields. Therefore time averaging should be applied for periods with uniform forcing if a priori information exists. To summarize we can conclude that objectively analyzed fields for the temperature and salinity let us investigate oceanographic properties modification for the period since 1900. Selected anomalies fields depict ability of the dataset to reproduce valid changes in water mass characteristics and reveal strong variations in thermohaline properties depending on atmospheric forcing and circulation pattern.