Variablitias Thermohlaine dan arus laut di jalur arlindo dan hubungannya dengan El-Nino Southern Oscillation (ENSO)

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Abstrak

Data kondisi batas laut-atmosfer dari NCEP/NCAR reanalysis periode 1974-2002 telah dijadikan masukan bagi simulasi model laut global MPIOM untuk wilayah regional perairan Indonesia tepatnya di jalur Arlindo. Studi ini menggunakan sistem model dengan grid curvilinier dengan dua kutub di wilayah China dan Australia. Model mensimulasi variabilitas thermohaline dan transport pada jalur Arlindo dan focus pada enam kanal utama di jalur Arlindo yang mewakili jalur masuk dan keluar utama (Selat Makassar, Lifamatola, Halmahera, Lombok, Ombai dan Timor).
Hasil validasi variabilitas temperatur dan volume transport hasil simulasi di jalur Arlindo di selat Makassar memiliki nilai korelasi berturut-turut 0.88 dan 0.71 dengan data observasi in-situ selama periode El- Niño (Januari 1997-Februari 1998). Variabilitas interannual temperatur dan salinitas di enam kanal menunjukkan bahwa lapisan thermocline (antara 47-220 meter) memiliki korelasi paling kuat dengan indeks ENSO, dibandingkan lapisan permukaan dan laut dalam. Korelasi temperatur dan salinitas dengan SOI dimajukan satu bulan tertinggi terjadi di selat Lifamatola (0.77) dan SOI dimajukan dua bulan tertinggi terjadi di selat Makassar (0.74).
Hasil simulasi di selat Makassar menunjukkan bahwa volume transport terbesar terjadi di lapisan 100-385 meter. Variabilitas transport mengikuti episode ENSO dengan transport maksimum pada periode La-Niña dan transport minumum pada periode El-Niño. Rata-rata volume transport di jalur Arlindo pada periode 1974-2002 menunjukkan bahwa nilai terbesar terjadi di selat Makassar, yaitu 9.8 Sv, kemudian selat Lifamatol 5.5 Sv dan selat Halmahera 1.5 Sv. Sementara itu di tiga kanal keluar, rata-rata volume transport bulanan masing-masing adalah selat Lombok 2.4 Sv, selat Ombai 5.7 Sv dan laut Timor sebesar 10.5 Sv.
.....Climatic boundary forcing fields from NCEP/NCAR re-analyses for a period between 1974 to 2002 were used as the major input forcing from atmosphere to drive the global ocean model MPIOM for the Indonesian archipelago focusing over the Indonesian Throughflow (ITF) region. This study applies a special model grid with curvilinear grid system that uses bipolar over Australian and China. The model simulates thermohaline and current variabilities within major ITF passages that represents three major inlets (Makassar, Lifamatola and Halmahera Straits) and three major outlets (Lombok, Ombai and Timor Straits). The model result validation using temperature and volume transport from the Arlindo Project gives a correlation of 0.88 and 0.71, respectively, over the Makassar Strait. The Arlindo project installed mooring buoy between January 2007 to February 2008 month or during a strong El-Niño 1997/1998. The interannual temperature and salinity variabilities in six major passages show that the thermocline (between 47 to 220 meter) has significant and better correlation with the ENSO index than the surface and deep ocean levels. Correlations of the temperature and salinity against SOI index reach the highest when time lag of one-two month is applied over the Lifamatola Strait (0.77) and over Makassar Strait (0.74).
The result of simulation indicates that the largest volume transport occurs at depth of 100-385 meter. Volume transport variability follows the ENSO episodes with maximum during La-Niña and minimum

during El-Niño. The average volume transport in Arlindo during the period of 1974?2002 shows that the largest volume transport occur in the Makassar strait 9.8 Sv, then the Lifamatola 5.5 Sv and the Halmahera 1.5 Sv.Meanwhile in the major outlets, average monthly volume transport in the Lombok, Ombai and Timor Straits are 2.4, 5.7 and 10.5 Sv, respectively.