Large-scale changes of the temperature frontal zones and regional features in heat transfer patterns based on SST data

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The intensity of heat transfer by currents influences on the location of energetically active zones in the ocean. In such zones the hydrological parameter gradients increase, which reveals the structure of frontal zones. SST data isn't enough to determine the location of such zones. In our work we calculate, according to AVHRR MCSST data, the temperature gradients in the ocean that show the large-scale changes of the temperature frontal zones (TFZ) for the 1982 – 1986 (average monthly) and 1990 – 2001 (average weekly) periods. To study how the temperature frontal zones are connected with the regional heat patterns, we use the data concerned with the space-time variability of SST gradients for separate Pacific regions. In our case the focus is placed on the investigation of the connection between the formation of the El Niño-Southern Oscillation (South-East Pacific) and the variability of the heat transfer near the shores of North-West Pacific. For the investigation of the main factors influencing on the heat redistribution in the ocean and of the reasons for the large-scale changes in the TFZ structure we use a two-dimensional horizontal numerical model of heat transfer. The model takes into consideration the current speed, turbulent diffusion and solar radiation. Besides, the results were obtained concerning heat transformation in several regions of North and South Atlantic which had been caused by the large-scale changes in the TFZ structure. The research results and model experiments allow to identify the time scale of the temperature field reaction in some regions of the ocean to the effect of heat transfer rate. The seasonal and interannual cyclic variation of the TFZ structure are used for the estimation of the global and regional regime of heat and mass transfer.