



High-altitude frontal Zones and short-period Fluctuations of Climate in the tropical Zones of the Oceans and in the Global Atmosphere

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Using NCEP/NCAR reanalysis data an investigation of the atmospheric circulation has been done for the years with the lowest North Atlantic Oscillation (NAO) indices and the lowest Arctic Oscillation (AO) indices and for the years with the highest values of these indices. It is shown that the AO mostly characterizes the Global Atmospheric Circulation (GAC), while the NAO influences primarily the Atlantic Ocean and regions adjacent to the continents. The analysis of the spatial correlation between the NAO-index and the zonal component of the wind velocity shows that significant correlations ($|r| = 0.7 - 0.8$) exist between these characteristics and that they extend over large geographical regions. The correlations are positive in Northern Europe and negative in Central and Southern Europe. The correlation between the zonal wind and the AO is weaker ($|r| = 0.4 - 0.5$), and the maximum values are observed in the upper troposphere. The investigation of the interaction between the GAC and the tropical ocean (Nino 3.4 SST) reveals maximum correlations in the lower troposphere above the central and eastern equatorial parts of the Pacific, where the traditional trade (eastern wind) regime weakens during the period of the positive SST anomalies and the equatorial western wind zone appears. The correlations between the lower tropospheric circulation and the SST anomalies in the tropical Pacific are ill-defined above the temperate and high latitudes of the Northern and Southern Hemispheres. It should be noted that the maximum correlation coefficients ($|r| = 0.8$) are observed for the equatorial western wind zone above the tropical Pacific, when the wind anomalies precede the SST anomalies by one month. This fact confirms once again that the western winds are one of the main reasons of the warm water appearance and the formation of positive SST anomalies in the central and eastern Pacific.