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Time Variations of the North Atlantic, South Oscillations and Edge Kinetic Energy in the Middle and Tropic Latitudes

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We investigate the temporal variation of the North-Atlantic and Southern oscillations (NAO and SO) and and edge kinetic energy KE in the middle and tropical latitudes in the Western and Eastern Europe during 1960-2010 years with a special attention to the European precipitation structure. The physical nature of these formations is explained in many Refs. (see [1-5])It is shown that the most large correlation coefficients between NAO indexes and month precipitation sums are defined for the west of Ukraine and for period of the long dominating the single NAO phase. Since last decades, many scientists use the new powerful tool based on the wavelet decomposition for analyzing various time series, expecially in a branch of geosciences. Below we use the algorithm, used by us in Refs. [4,5]. Wavelets are fundamental building block functions, analogous to the sine and cosine functions. Here, we use non-decimated decomposition method that has temporal resolution at coarser scales and allows to isolate time series of the major components of financial sets a direct way. The most valuable results of our analysis are as follows. We have found that the most essential relationship between the NAO index, eddy kinetic energy content is found for low frequency variatopns with the periods of 4-8 and 8-16 years. At that if the NAO phase tends to abrupt changes then an impact of these changes on the KE content is more soghnificant than for the durational dominance of the certain phase. The largest coefficients of correlation for the NAO index and the ukrainian precipitation are stated for the periodicities of 2-4, 4-8 years. As an example, let us give a brief analysis of the detail component D4 for the month rainfall in the Eastern Europe and NAO index. The largest correlation coefficient (0,59) is observed for the component D4 of the NAO index and month sum of rainfall in the the Eastern Europe. This component is important as its oscillation period is 4-8 years. The NAO index and month rainfall sums change almost synchronically. The rainfall quantity iscreases when the positive NAO phase dominates.

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