Geophysical Research Abstracts,
Vol. 11, EGU2009-1148, 2009
EGU General Assembly 2009

An energetic perspective to the effect of NAO on the climate of South West Asia

m. nasr esfahany, Alireza Mohebalhojeh, and Farhang Ahmadigivi
Institute of Geophysics, university of Tehran, Tehran, Iran (mnasr@irimo.ir/0098-21-88009560)

The time tendency equation of eddy kinetic energy (EKE) includes some important forcing terms like baroclinic conversion (BCC), barotropic conversion (BTC) and energy flux. This article considers the ensemble mean distribution of these forcing terms, as well as the baroclinic generation (BCG) term, in both critical positive and critical negative months of the North Atlantic Oscillation (NAO), focusing on Mediterranean and Middle East regions. In addition to the usual averaging, also considered is the averaging over positive and negative values separately in order to avoid cancellation effects.

Comparing the results for the positive and negative phases of NAO, for the distribution of EKE the difference between the two phases is insignificant over Mediterranean region but increases eastward to Middle East region. All the computed terms attain larger values at the positive phase. Whereas the BCC term is larger at higher latitudes, the BTC term finds its maxima to the north of subtropical jet as two separate cells, one over the west of Iran and another over the central region of the Mediterranean Sea. The minimum of BTC is located at south of subtropical jet. All the maxima and minima are stronger in the positive phase.

The energy flux vectors point to energy transfer from the west of Atlantic and north of Europe to Mediterranean region, with the transfer being weaker at the positive phase. There is energy flux divergence over the central region of the Mediterranean Sea, which is more extensive at the positive phase relative to the negative phase. The energy flux divergence leads to a radiation source in this region. The direction of energy flux vectors then indicates that the energy radiated from the central Mediterranean region is transferred southeastward, leading to an energy flux convergence over the Red sea and north east of Africa in the positive phase. This convergence is stronger and more extensive in the positive phase, which may be responsible for the observed stronger subtropical jet at the positive phase. The pattern of the BCG term indicates that the Mediterranean cyclogenesis region is affected by the North Atlantic storm track less strongly in the positive phase than the negative phase.