



Shifts of seasons at mid-latitudes: Natural fluctuations correlated with the North Atlantic Oscillation

M. Palus (1) and D. Novotna (2)

(1) Institute of Computer Science, Academy of Sciences of the Czech Republic,
Pod vodarenskou vezi 2, 182 07 Prague 8, Czech Republic, E-mail: mp@cs.cas.cz;

(2) Institute of Atmospheric Physics, Academy of Sciences of the Czech Republic,
Bocni II/1401, 141 31 Prague 4, Czech Republic, E-mail: nov@ufa.cas.cz

Daily mean near-surface air temperature series from seven European locations were processed in order to obtain reliable estimates of instantaneous phases of the annual cycle as an objective measure of timing of seasons. The advancement of spring seasons in 1990's has been confirmed, however, these changes do not depart from the range of natural phase fluctuations observed in the historical temperature records. Significant, geographically dependent correlations of the phase fluctuations with the North Atlantic Oscillation index, as well as weaker, negative correlations with the El Niño Southern Oscillation index have been observed.