Regional patterns in the temperature response of phenological phases across Europe

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Impacts of recent climate change have been detected in many physical and biological systems; numerous of these studies analysed changes in the annual timing of events in plant and animal life cycles (phenology) in response to global warming. In major parts of the temperate and boreal zone of the Northern Hemisphere, spring warming is associated with observed earlier onset dates. In order to calculate the altered phenology under future climate scenarios, divers phenological models - ranging from statistical to process based ones - are applied; however all of them require fitting of more or less parameters using spatially distinct phenological and climate data. We therefore determine possible regional patterns in the temperature response of different phenological phases across Europe in order to make the necessity of explicit phenological data obsolete. Phenological data comprised the observations of cloned plants within the Network of the International Phenological Gardens (1959-2003) in order to discard possible genetically caused effects. Temporal trends (1971-2000, 10+ years) displayed a general advance of spring phases (0.5 to 1.0 days / year), however with regional differences: Trends were significantly stronger in the Western than in the Eastern parts of Europe. Autumn phases revealed a more heterogeneous pattern of changes. The temperature response was determined by linear regressions of onset dates against mean monthly temperatures of the HadCRUTEM2v data set (Jones & Moberg 2003) of the respective grid. The pattern of the slopes (days / ˚C) was then explained by geographical coordinates, latitude and different climate parameters. Detailed results are presented on the poster.