

# Periconnection: Neighborhood and directional eco-effects newly realized between ecosystem productivity and snow phenology

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## Abstract

How snow phenology (SP) regulates ecosystem productivity (EP), especially for those lower- and higher-EP ecosystems, is a point of interest for understanding of climate-biosphere interactions but has been an open macroecological question. We were further curious about its premise – must this eco-effect be caused by the SP in the same site exclusively? To handle these puzzles, we creatively proposed a new concept of “periconnection”, following the way of defining “teleconnection” but also expandingly probing the possible connections to neighborhoods, for reflecting the ecological links between EP and the SP of the same and neighboring sites. Analyzing two piled-up datasets of vegetation dynamics (1999–2013) and SP (2001–2014) in the Northern Hemisphere ( $>45^{\circ}\text{N}$ ), we found that the lower- and higher-EP ecosystems showed weaker tendencies of EP increasing than the average one for all of the ecosystems; the Arctic circumpolar EP was more sensitive to the snow-onset than -end SP; the EP variations of the ecosystems, including those of the lower- and higher-EP ones, were driven more by the SP around – termed as neighborhood eco-effect; further, such drivings occurred more to north in North America while more to south in North Eurasia – as directional eco-effect. Overall, the novel “periconnection” concept is of fundamental implications for advancing the progress of many fields ranging from ecology to Earth interactions.

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## Figures

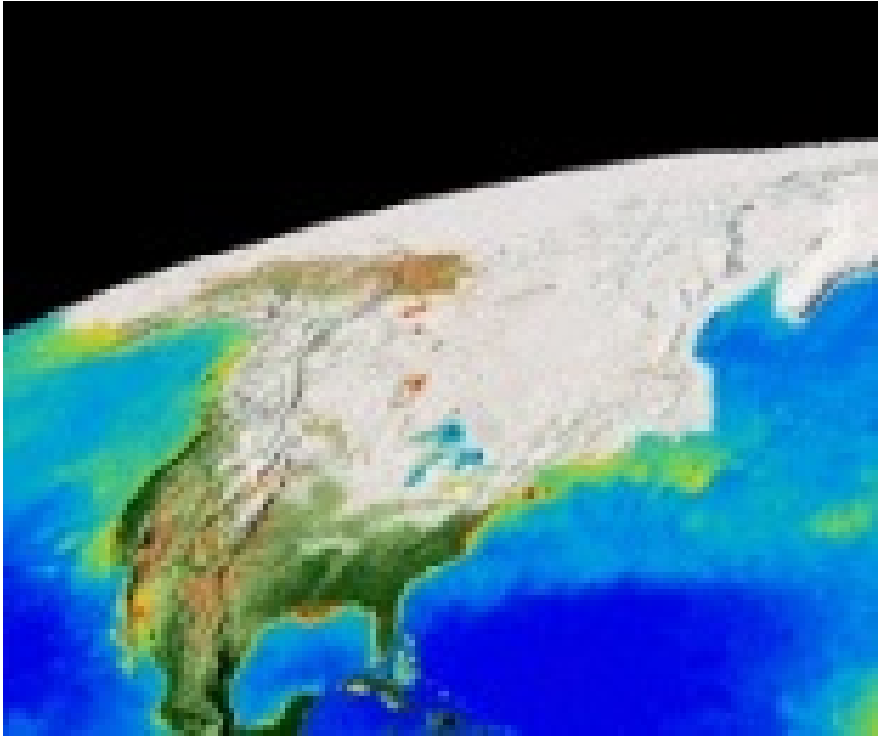


Fig. 1

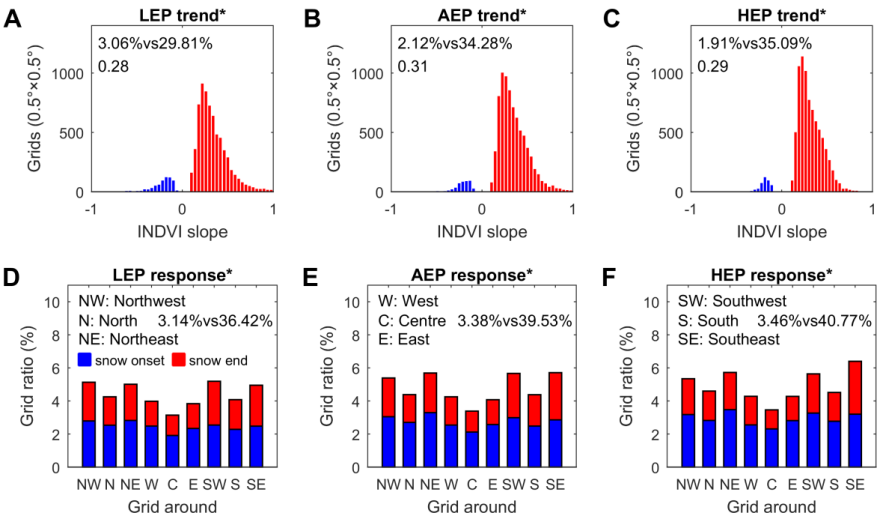


Fig. 2

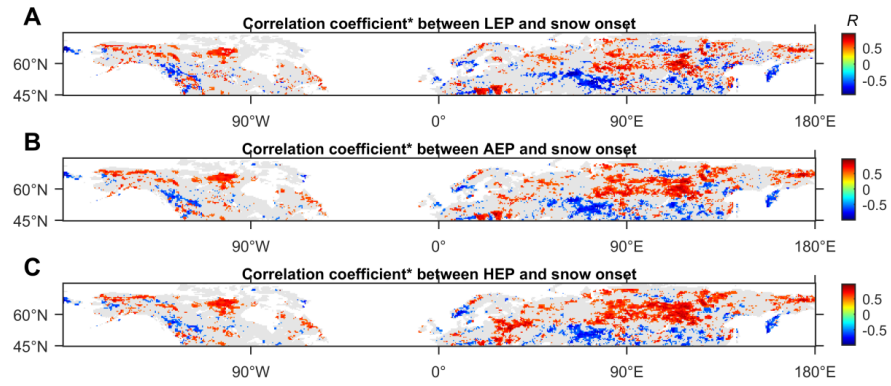


Fig. 3

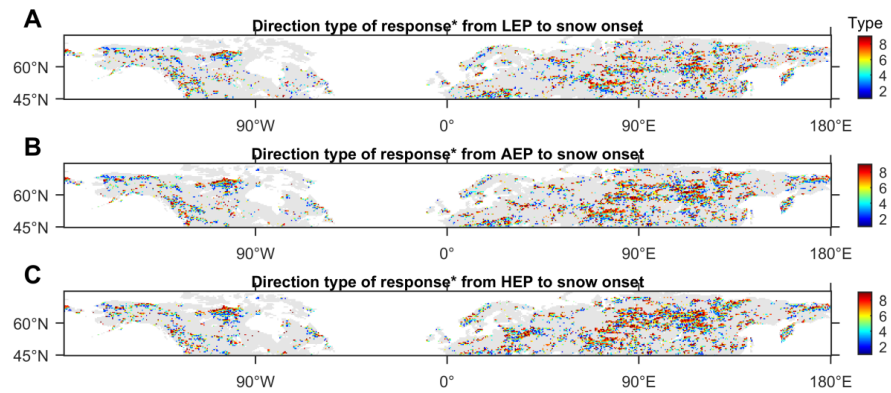


Fig. 4

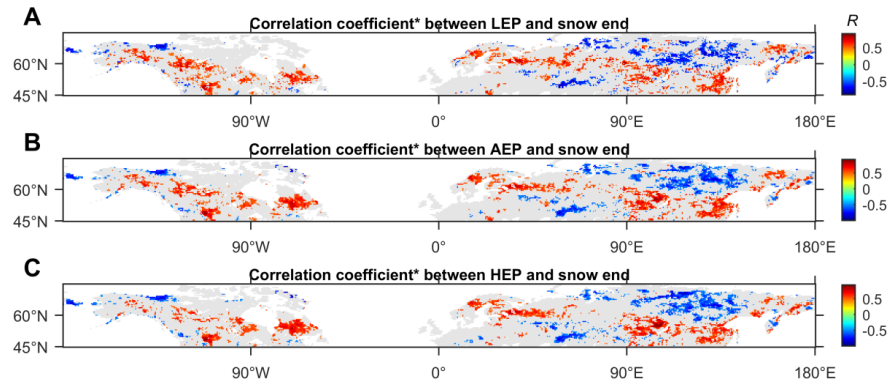


Fig. 5

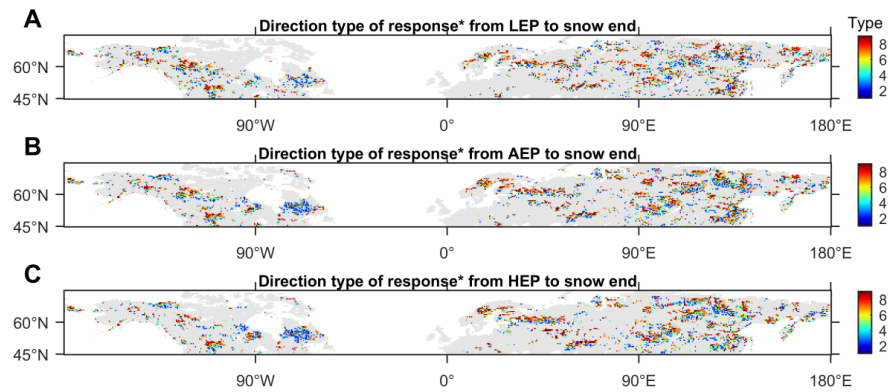


Fig. 6

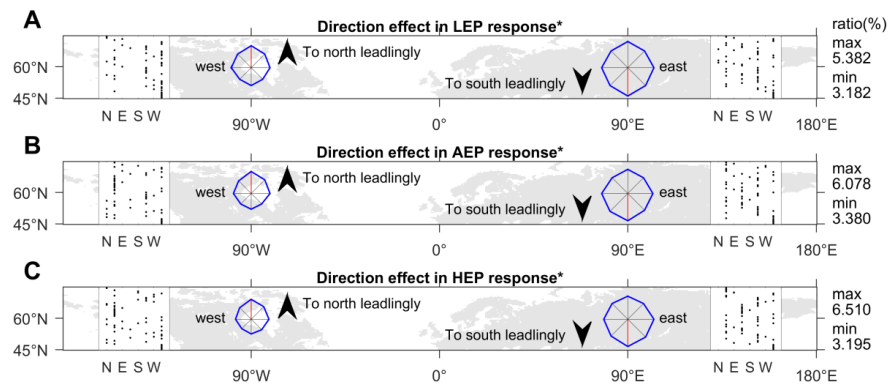


Fig. 7

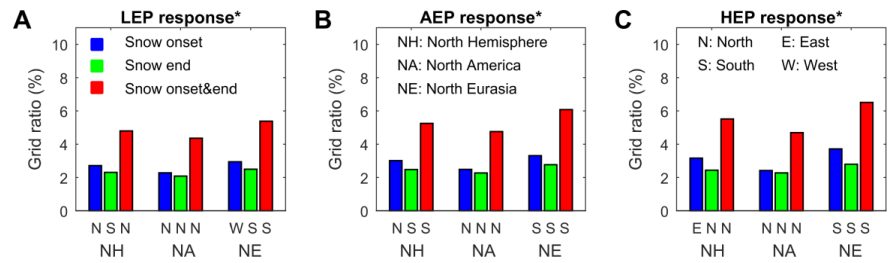


Fig. 8