



## **Northern Hemisphere snow cover and atmospheric blocking**

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The inter-seasonal relationship between Northern Hemisphere (NH) snow cover and regional blocking pattern is explored for a 31-yr data sets. Observational results provide strong evidence of two primary linkages in the seasonal snow cover-blocking relationship that support an interannual persistence cycle: one, where winter Atlantic (ATL) blocking leads spring (summer) Eurasian (North American) snow cover anomalies and a second one with spring (summer) Eurasian (North American) snow cover resulting in an anomalous next winter ATL blocking activity. Snow cover anomalies can modulate regional blocking activity, especially over the West Pacific (WPA) sector, where atmospheric blocking is sensitive to snow cover fluctuations occurring over western Eurasia. Simultaneously, persistent blocking patterns over ATL and WPA sectors act as a controlling mechanism of snow cover, essentially over western Eurasia and Hudson's Bay.

The winter ATL blocking-to-summer snow cover linkage seems to occur through a sequence of teleconnections. According to that, an enhanced ATL blocking activity in winter favors a later spring snow disappearance through an enhanced cold advection towards western Eurasia. The resulting snow cover anomalies partially force an opposite-sign blocking response over west and central Pacific which is sustained through spring and early summer, presumably due to the persistence of snow cover anomalies. This anomalous pattern seems to play a role in the propagation of snow cover anomalies from Eurasia in spring to the Hudson's Bay region of North America in summer. These linkages identify snow cover as a candidate for the recently observed blocking trends.