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The Interaction Between Two Separate Propagations of Rossby Waves

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This study deals with two teleconnection patterns and subsequent wave-train propagations during an East Asian summer. Diagnostic results are: (1) A stationary wave ray with zonal wavenumber 5 approximates the arc path (OKJ arc path) linking the correlation centers originating from the Caspian Sea via Lake Baikal to the sea off the southeast coast of Japan (as a focus area) in a pentad correlation map between Z500 and OLR at 30°N, 150°E in June 1979–98. Ray tracing shows that it took 8–10 days for this stationary wave to propagate from an initial position around the Caspian Sea to the focus area, which roughly coincides with the observed case in July 1998. (2) A wave-train pattern (P-Ja) observed in boreal summer propagated along the arc line in the same way as the normal poleward Rossby wave train (P-J) originating from the Philippines across the North Pacific, but with a phase shift northeastward of about 90°. (3) Further correlation analyses showed that P-J-like waves belong mainly to intraseasonal propagating ones while OKJ waves belong mainly to intraseasonal stationary ones in general. (4) Propagation of the newly observed wave-train pattern (P-Ja) occurred following another wave-train along the OKJ arc path in mid-July 1998. Both northeastward and southeastward wave propagations merged off the east coast of Japan. (5) The northeastward-propagating wave train observed in mid-July 1998 was triggered by the southeastward-propagating (OKJ) wave train that produced a deep cyclonic circulation and a strong convective activity in the focus area. The link of wave forcing and deep convection was made solely because of a strong upper-level divergence in the focus area.

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