Reply

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We agree with Drs. Latif and Venzke (2000) that the midlatitude oceanic gyre circulation will exhibit a delayed response to basin-scale wind stress curl anomalies even when these anomalies last for about a decade. Indeed, we incorporated this delay in our calculations of the decadal-scale change in the strength of the Kuroshio Current extension by lagging the geostrophic zonal transport inferred from upper-ocean temperature profiles relative to the Sverdrup transport inferred from the wind stress curl field (Deser et al. 1999). Whether the gyre circulation has time to adjust fully to the wind stress curl anomalies (and hence achieve a quasi equilibrium) depends upon the nature of the wind forcing (in reality, the wind is always changing and the ocean is never in true equilibrium). If the wind forcing is assumed to be sinusoidal with a period of approximately 20 yr as proposed by Latif and Venzke, then the gyre circulation will be continually adjusting to the wind anomalies. If, however, the wind forcing is viewed as nonsinusoidal in nature, with an extended period (10–20 yr) in one phase followed by a rapid transition to the opposite phase with comparable duration (cf. Trenberth and Hurrell 1994), then the gyre circulation will have time to come into approximate balance with the wind forcing, given a Rossby wave transit time of about 4–5 yr. Whether the observed chronology of wind stress curl anomalies over the North Pacific is best viewed in terms of a smoothly varying sinusoid or in terms of a rapid transition between two decadal states is open to debate: in our opinion, both views are simplified representations of the true system.

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