How potentially predictable are midlatitude ocean currents?

Masami Nonaka[1*]

Yoshikazu Sasai[1]

Hideharu Sasaki[1]

Bunmei Taguchi[1]

and

Hisashi Nakamura[1, 2]

[1]Japan Agency for Marine-Earth Science and Technology, Yokohama, 236-0001, Japan

[2]Research Center for Advanced Science and Technology, University of Tokyo, Tokyo,

153-8904, Japan

Corresponding author address:

Masami Nonaka

Japan Agency for Marine-Earth Science and Technology (JAMSTEC),

3173-25 Showa-machi, Kanazawa-ku, Yokohama, 236-0001 Japan
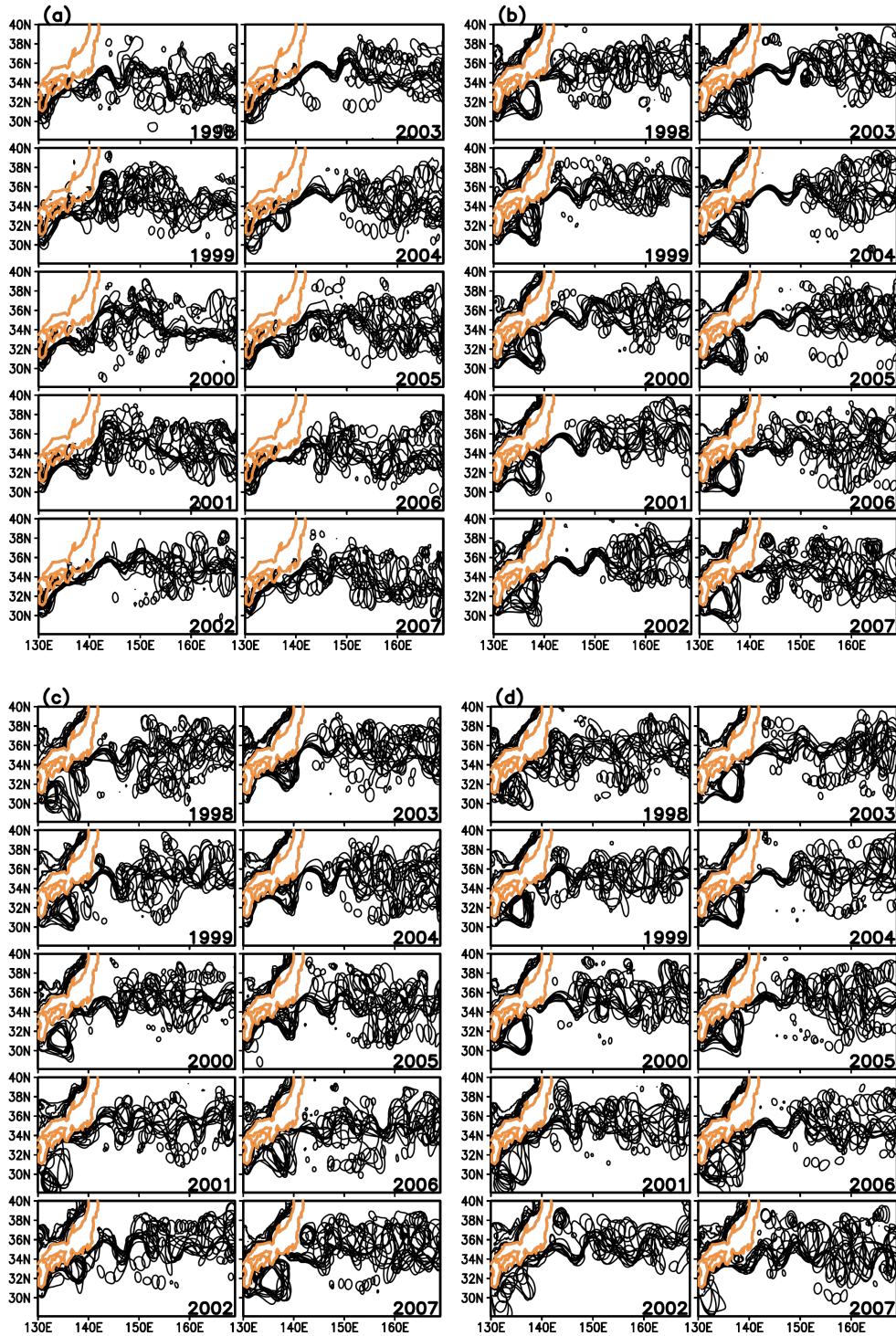
nona@jamstec.go.jp

Figure S1. Stability of the Kuroshio and Kuroshio Extension path. Following Qiu and Chen (2005, 2010, 2014), yearly paths of the jet marked by a given monthly SSH contour based on satellite observations (**a**; SSH = 100 cm) and for the hindcast ensemble members B01 (**b**), B02 (**c**), and A (**d**) (SSH = −10 cm). All plots are generated with GrADS version 2.0.a8 (http://grads.iges.org/grads/head.html).
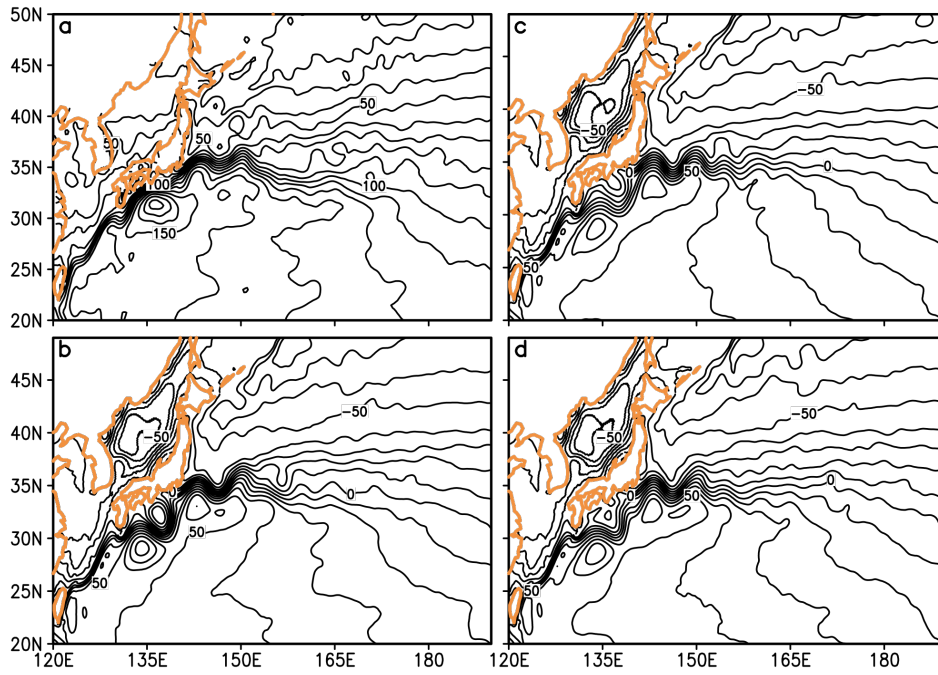
Figure S2. Long-term mean fields of sea surface height (SSH). 1995-2012 annual mean SSH field based on observations (**a**) and for the ensemble members B01 (**b**), B02 (**c**), and A (**d**). Contour intervals are 10 cm. All plots are generated with GrADS version 2.0.a8 (http://grads.iges.org/grads/head.html).
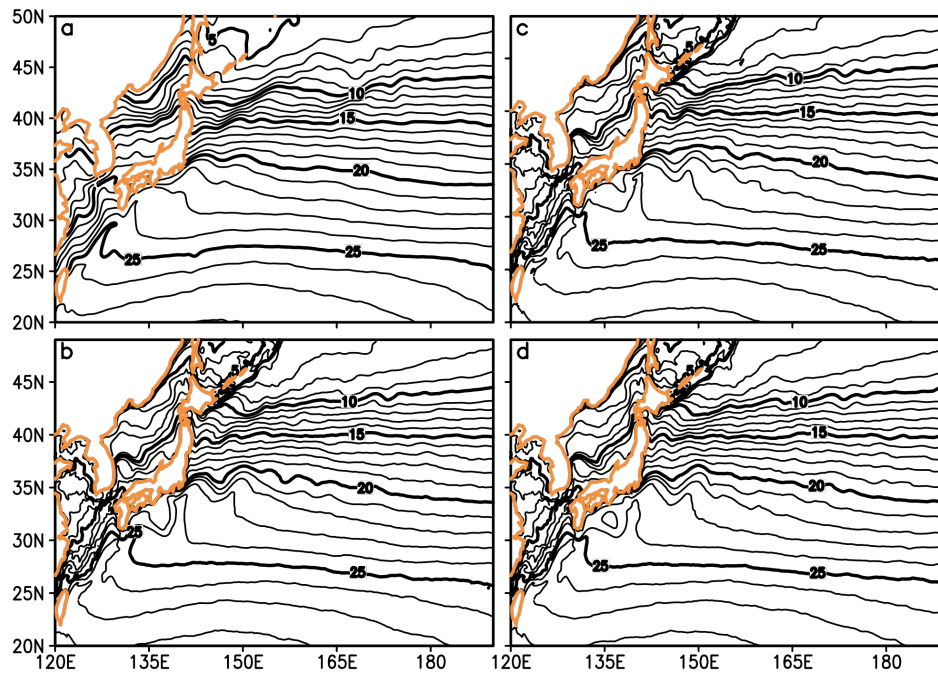
Figure S3. Long-term mean fields of sea surface temperature (SST). Same as Figure S2 but for SST field. Contour intervals are 1.0 °C. Observed SST data product of Reynolds et al. (2007) is used for panel **a**. All plots are generated with GrADS version 2.0.a8 (http://grads.iges.org/grads/head.html).
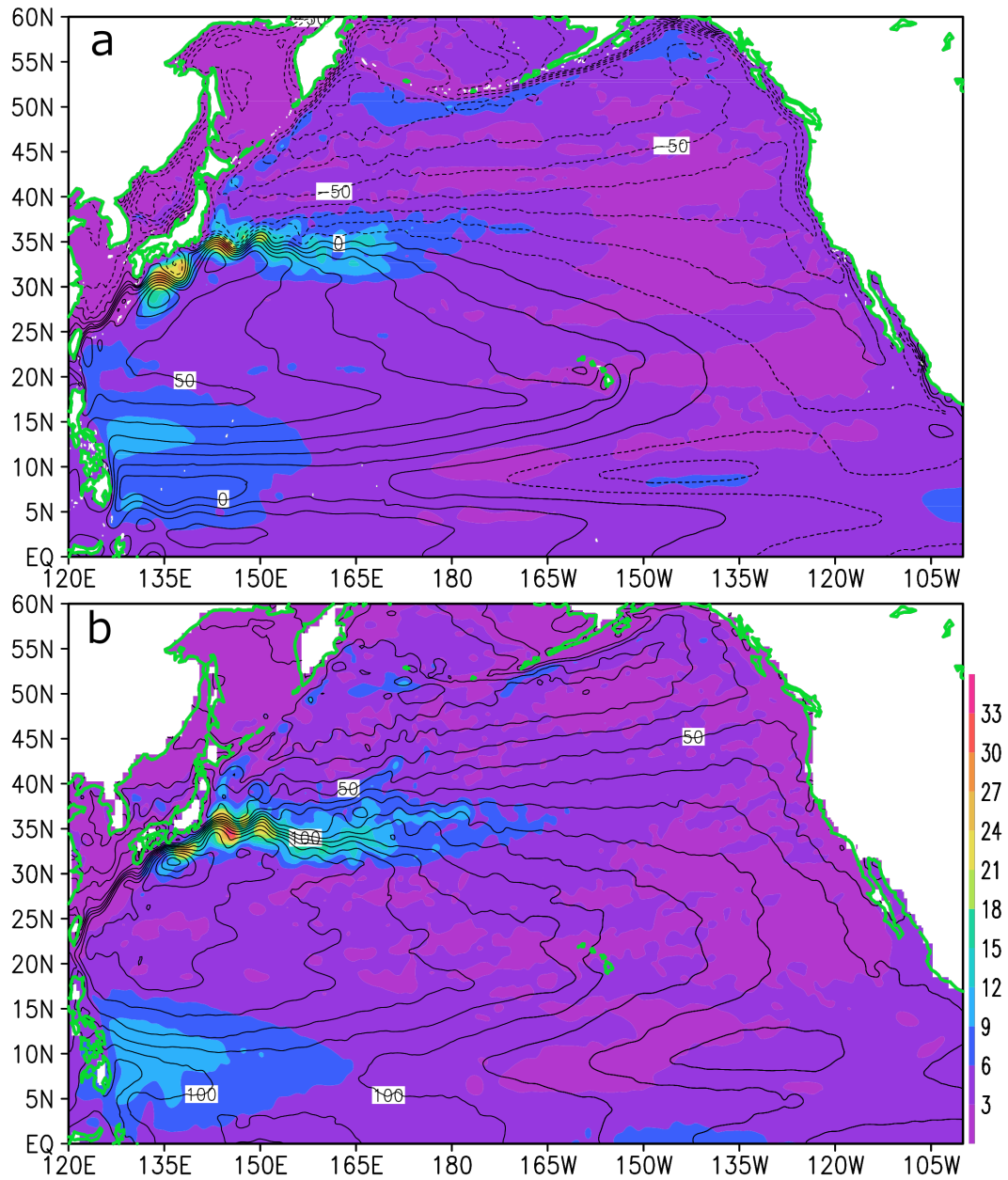
Figure S4. Maps for the ensemble mean and observed fields of sea surface height (SSH) and its standard deviations. SSH standard deviations of its 13-month running-mean time series in 1995-2012 (shades, unit is cm) and the annual mean SSH field (contours with intervals of 10 cm) in the same period for the average over the three ensemble members (**a**) and for the observations (**b**). The running mean is applied to highlight interannual variability. All plots are generated with GrADS version 2.0.a8 (http://grads.iges.org/grads/head.html).

References in Supplementary Material

1. Qiu, B., & Chen, S. Variability of the Kuroshio Extension jet, recirculation gyre and mesoscale eddies on decadal timescales. *J. Phys. Oceanogr.* **35**, 2090–2103 (2005).

2. Qiu, B., & Chen, S. Eddy-mean flow interaction in the decadally modulating Kuroshio Extension system. *Deep-Sea Res.-II* **57**, 1098-1110 (2010).

3. Qiu, B., Chen, S., Schneider, N., & Taguchi, B. A coupled decadal prediction of the dynamic state of the Kuroshio Extension system. *J. Clim.* **27**, 1751-1764 (2014).

4. Reynolds, R. W., Smith, T. M., Liu, C., Chelton, D. B., Casey, K. S., Schlax, M. G. Daily High-Resolution-Blended Analyses for Sea Surface Temperature. *J. Clim.* **20**, 5473-5496 (2007).