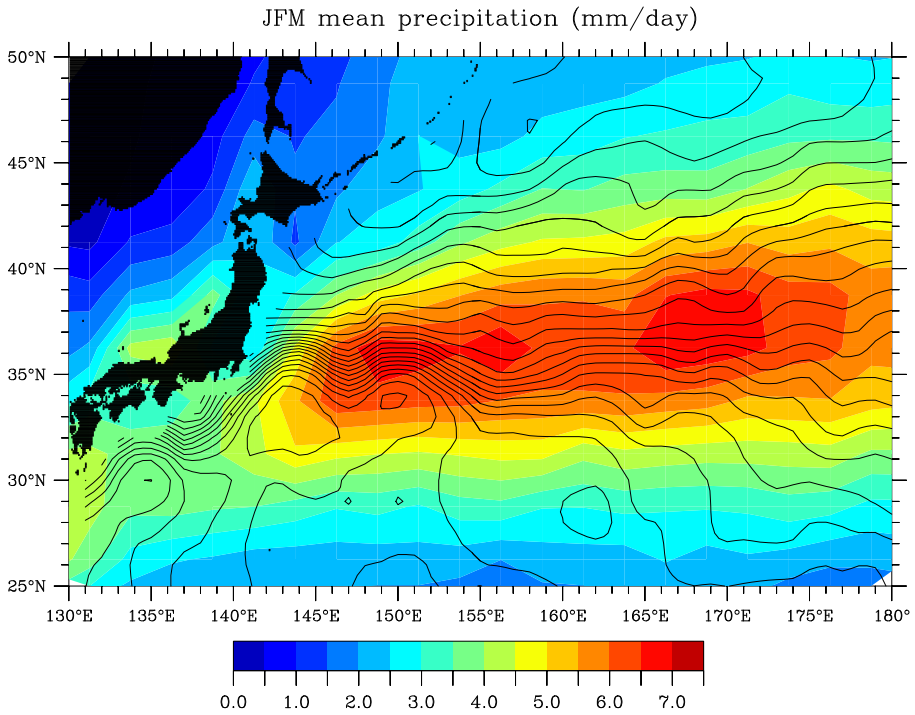

Figure 6: Wintertime (JFM) mean precipitation over the North Pacific Ocean. Based on Xie and Arkin (1997). Contours: Sea surface dynamic height (0/1000 db) climatology from Teague et al. (1990).

loss from the ocean to the atmosphere is largest. Given the proximity of the areas of maximum air-sea heat exchange, atmospheric storm tracks, and maximum oceanic variability, it is conceivable that the large-scale fluctuations occurring in the Kuroshio Extension system could change the upper ocean heat balance and modify the atmospheric circulation at long time scales by altering the baroclinicity and positions of the wintertime storms (*e.g.*, Nakamura and Izumi 2002; Joyce et al. 2001). Although KESS does not address the issue of midlatitude ocean-atmosphere coupling, a better understanding of the dynamics and thermodynamics of the time-varying Kuroshio Extension and its recirculation gyre clearly contributes to our goal of unraveling the coupled ocean-atmosphere system as a whole.

Numerical models of ever-increasing resolution are being applied to western boundary current systems, generally in the context of full basin models, given today's computer capabilities and the need to avoid open boundary conditions. As they achieve grid spacings of about 6 km or less, a threshold seems to be reached where the models simulate realistic deep eddy variability, and with concomitant vertical coupling between the upper meandering jets and deep flows, and realistic paths and separation (Hurlburt and Hogan 2000; Hurlburt and Metzger 1998; McClean et al. 2002). Ever more powerful and fine resolution models are becoming accessible (*e.g.*, NLOM, HYCOM, POP, JAMSTEC). This modeling community recognizes the essential role played by mesoscale processes for the models to realistically simulate the circulation (see letters of collaboration from Drs. Hurlburt and McClean in Section I). Mesoscale eddies and meanders play a crucial role in driving and modulating the broader scale circulation through its defining influence on volume transport and poleward heat transport of the WBC system. However, there are important differences between the Atlantic and Pacific Oceans in terms of the topography, stratification / PV structure, neighboring subarctic circulation, wind curl and thermohaline forcing. Therefore, it would be unwise to assume that models should seek to replicate in the Kuroshio the same processes that are at work in the Gulf Stream. New observational process-studies are required in the Pacific and particularly in the Kuroshio Extension, tailored to address these issues and to use as measures of model fidelity.