The Pacific-Japan (PJ) teleconnection pattern is a dominant variability pattern over the summertime western North Pacific (WNP), characterized by a meridional dipole of zonally-elongated vorticity anomalies in the lower troposphere and anomalous precipitation over the tropical WNP. An analysis of multi-model 20th-century climate simulations by the CMIP3 coupled models reveals that inter-model diversity in the summertime climatological-mean fields over the WNP, especially in the lower troposphere, is projected most strongly onto the PJ pattern, suggesting a sensitivity of the climatological-mean state toward the particular pattern. In addition, reproducibility of the PJ pattern in the individual models tends to be higher for those models in which the climatological-mean state over the WNP is better reproduced. Projected future changes in the summertime climatological-mean state under the SRES A1B emission scenario also bear certain similarities with the PJ pattern, in a manner consistent with the aforementioned sensitivity of the model climate to that pattern. In the multi-model ensemble mean, a projected enhancement of tropospheric stratification overwhelms a precipitation increase over the tropical WNP, to achieve a dynamical consistency. However, the polarity and magnitude of the PJ-like projected change vary substantially from a model to another.