Long-term trend pattern in SSTs and atmospheric circulations

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During the coming winter, El Niño and La Niña, which are the dominant predictable inter-annual variation of the climate system, are unlikely to develop. Without El Niño or La Niña, it is difficult to make a winter season prediction from the viewpoint of inter-annual variation. Thus, heavy weight should be given to the long-term trend and decadal variation as grounds for the coming winter prediction. In the presentation, long-term trend patterns, which are defined by linear trends from the end of 1970s, and decadal variation patterns in SSTs and atmospheric circulations in winter are described as follows.

1. In addition to the global warming trend, La Niña-like trend is seen in SSTs.
2. Trends in the atmospheric circulations associated with the La Niña-like trend in SSTs are found, such as active convection over the Maritime Continent, an anti-cyclonic circulation anomaly in the upper troposphere around the East China Sea and cyclonic circulation anomaly in the northern part of the North Pacific.
3. Above-mentioned La Niña-like pattern in SSTs and the associated atmospheric circulation anomalies pattern are clearer in the recent decade winters mean. The recent decade winters mean SST anomaly pattern over the globe, including the La Niña-like pattern, resembles to the regression pattern from the secondary dominant decadal mode of SST variation in the Pacific Ocean, such as the North Pacific Gyre Oscillation (E.D. Lorenzo et al., 2008).

Since SST anomalies pattern in August 2008 resembles to that of the recent decade mean and El Niño is unlikely to develop, it is natural to consider that the pattern will persist during the coming winter.

The SST anomaly pattern fed to the JMA atmospheric global model for the seasonal prediction is similar to that of the recent decade winters mean SST anomaly pattern. In association with the SST anomaly pattern, the predicted ensemble averaged atmospheric circulation anomaly pattern by the model is also similar to that of the recent decade winters mean circulation anomaly pattern in the tropics and the sub-tropics. This result clearly indicates that the greatest signal for the coming winter prediction comes from the long-term trend including decadal variation.