The Western Pacific Monsoon region encompasses a number of nations in both hemispheres affected by the annual cycle of the large-scale Australia-Asian monsoon. It experiences a westerly wind reversal during the summer months accompanied by a peak in rainfall. We investigate the ability of climate models to capture these important features which is regarded as important when developing climate change projections. While a seasonal wind reversal appears to be reasonably well simulated by most models, the relationship with seasonal rainfall points to potential problems with some models. This tends to reduce the number of models which can be claimed to realistically simulate the present day climate of the region. The implications for methods for developing climate change projections for the region are discussed.