Recent Decadal Variations of El Nino Predictability

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Predictive skill for El Niño in the equatorial eastern Pacific across a range of forecast models declined in the early 21st century relative to what was achieved in the late 20th century. This decline coincided with a reduction of El Niño variability in the eastern Pacific and a shift in Pacific climate to an enhanced east-west surface temperature gradient and stronger trade winds in the central Pacific, which has previously been associated with the recent hiatus in global surface warming. It is an outstanding question as to whether this shift in climate at the end of the 20th century acted to weaken El Niño variability, hence predictability, or whether El Niño variability weakened by chance thus reducing predictability but in so doing resulted in the shift in climate. Using seasonal forecast sensitivity experiments with the Australian Bureau of Meteorology coupled model POAMA2.4, the shift to intensified east-west surface temperature gradient and stronger central Pacific trade winds is shown to weaken the ocean-atmosphere feedback that amplify eastern Pacific El Niño, thus resulting in weaker variability that is less predictable. This weakened coupling helps explain the fitful behaviour and challenges for forecasting the non-developing El Niño in early 2014. In contrast, the Pacific mean state appears to have swung to a more favourable condition for promoting El Nino toward the end of 2014, thus supporting stronger development of El Nino in 2015.