

## FGOALS\_g快速耦合模式模拟的北太平洋年代际变率

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**摘要** 本文分析了由中国科学院大气物理研究所大气科学和地球流体力学数值模拟国家重点实验室 (LASG/IAP) 最新发展的FGOALS\_g快速耦合模式300 a积分模拟结果, 通过与多种观测资料的对比分析, 讨论了北太平洋年代际变率的时空结构、主要年代际模态的演变特征以及与ENSO的联系等研究内容. 结果表明: 该模式能成功模拟出北太平洋年代际变率的主要空间分布特征; 模拟的年代际模态具有多时间尺度性, 其中最显著的是周期约为10~20 a左右的准20年振荡模态, 该模态上层海洋热容量异常的演变过程主要表现为大致沿副热带海洋涡旋做海盆尺度顺时针旋转的特征, 相应的大气异常不仅与阿留申低压的变异有关, 而且与太平洋-北美 (PNA) 遥相关型以及上游的欧亚大气环流异常有密切关系; 模拟的北太平洋年代际变率对年际ENSO循环的发生频率和强度有明显的调制作用. 但模拟的KOE区和阿拉斯加湾SST异常振幅比观测偏强, 这与模式海冰偏多、高纬度SST偏冷的误差有关.

**关键词** [FGOALS\\_g快速耦合模式](#), [年代际变率](#), [太平洋年代际振荡\(PDO\)](#), [ENSO](#)

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## Decadal variability in the North Pacific as simulated by FGOALS\_g fast coupled climate model

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**Abstract** This study examines the North Pacific decadal-to-interdecadal variabilities as simulated by a fast version of the coupled climate model namely FGOALS\_g developed at LASG/IAP. The spatio-temporal structures of those variabilities and the evolution of the dominant mode together with its relation to El Niño-Southern Oscillation (ENSO) are analyzed with a 300-yr integration of the coupled model. The results indicate that the model reproduces well many features of the observed North Pacific variability. Similar to that in reality, the simulated modes are characterized by timescales ranging from decades to multidecades. However, the most prominent mode is a bidecadal mode with a principal period roughly 10~20-yr. The evolution of the bidecadal mode exhibits a clockwise rotation of the upper-ocean heat content anomalies in an association with the subtropical gyre. The corresponding atmospheric circulation anomalies are associated with the variabilities of Aleutian low, Pacific North American (PNA) teleconnection and atmospheric circulation over Eurasia. Both the simulation and the observation show that the North Pacific decadal-to-interdecadal variabilities play an important role in modulating the frequency and strength of interannual ENSO events. However, the simulated SST anomalies are fairly larger than that of observations in Kuroshio/Oyashio Extension (KOE) region and Gulf of Alaska. This may be attributed to the excessive sea ice coverage error and SST cool biases over high-latitude in coupled model.

**Key words** [FGOALS\\_g fast coupled climate model](#), [Decadal variability](#), [Pacific Decadal Oscillation\(PDO\)](#), [ENSO](#)

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