

The CLIVAR C20C Project. Skill of simulating Indian monsoon rainfall on interannual to decadal timescales.

by

F. Kucharski¹, A. A. Scaife², J. H. Yoo¹, C. K. Folland², J. Kinter³, J.
Knight², D. Fereday², A. M. Fischer⁴, E. K. Jin^{3,5}, N.-C. Lau⁶, T.
Nakaegawa⁷, M. J. Nath⁶, P. Pegion⁸, E. Rozanov⁹, S. Schubert⁸, P. V.
Sporyshev¹⁰, J. Syktus¹¹, A. Voldoire¹², J. H. Yoon¹³, N. Zeng¹³, T. Zhou¹⁴

January 2008

¹The Abdus Salam International Centre for Theoretical Physics, Earth System Physics Section, Trieste, IT.

²Met Office Hadley Centre (MOHC), FitzRoy Road, Exeter, Devon, EX1 3PB, UK.

³Centre for Ocean-Land-Atmosphere studies, USA.

⁴Institute for Atmospheric and Climate Science, ETH Zurich, Switzerland

⁵and George Mason University, USA.

⁶Geophysical Fluid Dynamics Laboratory, Princeton, USA.

⁷Meteorological Research Institute, Japan Meteorological Agency, JAPAN.

⁸NASA Goddard Space Flight Centre, USA.

⁹Physical-Meteorological Observatory/World Radiation Center, Davos, Switzerland

¹⁰Voeikov Main Geophysical Observatory, St. Petersburg, RUSSIA.

¹¹Queensland Department of Natural Resources and Water, Australia

¹²CNRM/GAME, Meteo-France/CNRS, FRANCE.

¹³University of Maryland, USA.

¹⁴LASG, Institute of Atmospheric Sciences, Beijing, CHINA

1 Abstract

The ability of atmospheric general circulation models (AGCMs), that are forced with observed sea surface temperatures (SSTs), to simulate the Indian monsoon rainfall (IMR) variability on interannual to decadal timescales is analyzed in a multimodel intercomparison. The multimodel ensemble has been performed within the CLIVAR International “Climate of the 20th Century” (C20C) Project. This paper is part of a C20C intercomparison of key climate time series. Whereas on the interannual timescale there is modest skill in reproducing the observed IMR variability, on decadal timescale the skill is much larger. It is shown that the decadal IMR variability is largely forced, most likely by tropical sea surface temperatures (SSTs), but as well by extratropical and especially Atlantic Multi-decadal Oscillation (AMO) related SSTs. In particular there has been a decrease from the late 1950s to the 1990s that corresponds to a general warming of tropical SSTs.