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Annual variation of global precipitation

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The annual variations of global precipitation were analyzed to validate the climate simulations of global climate models. The annual mode of global-mean precipitation P_{GH} follows that of the Northern-Hemisphere mean precipitation (P_{NH}) and the Asian-Australian (AA)-monsoon hemisphere (60°E - 120°W) mean precipitation P_{AA} . The semiannual mode of precipitation emerges from both P_{AA} and P_{EA} precipitation in the extra-AA monsoon hemisphere, but this mode of P_{GH} follows P_{AA} . A spring-fall annual mode is also identified in precipitation. This mode in P_{GH} is contributed primarily by P_{EA} . The annual variation of precipitation and maintenance in three groups of global climate models (US models, DEMETER, and SMIP2) were analyzed. Despite the oversimulation of P_{GH} , the winter-summer annual and semiannual modes were undersimulated over the AA-monsoon region, and the spring-fall mode was undersimulated over the extra-AA monsoon region. Maintained by convergence of water vapor, these undersimulations of precipitation imply that of convergent circulation over the regions.