Team MIROC: Improved climate simulation by MIROC5: Mean states, variability, and climate sensitivity

<u>Masahiro Watanabe</u>[†]; Tatsuo Suzuki; Ryouta O'ishi; Yoshiki Komuro; Shingo Watanabe; Seita Emori; Toshihiko Takemura; Minoru Chikira; Tomoo Ogura; Miho Sekiguchi; Kumiko Takata; Dai Yamazaki; Tokuta Yokohata; Toru Nozawa; Hiroyasu Hasumi; Hiroaki Tatebe; Masahide Kimoto [†] The University of Tokyo, Japan Leading author: <u>hiro@aori.u-tokyo.ac.jp</u>

Anew version of the atmosphere-ocean general circulation model cooperatively produced by the Japanese research community, known as the Model for Interdisciplinary Research on Climate (MIROC), has recently been developed. A century-long control experiment was performed using the new version (MIROC5) with the standard resolution of the T85 atmosphere and 18 ocean models. The climatological mean state and variability are then compared with observations and those in a previous version (MIROC3.2) with two different resolutions (medres, hires), coarser and finer than the resolution of MIROC5. A few aspects of the mean fields in MIROC5 are similar to or slightly worse than MIROC3.2, but otherwise the climatological features are considerably better. In particular, improvements are found in precipitation, zonal mean atmospheric fields, equatorial ocean subsurface fields, and the simulation of El Niño-Southern Oscillation. The difference between MIROC5 and the previous model is larger than that between the two MIROC3.2 versions, indicating a greater effect of updating parameterization schemes on the model climate than increasing the model resolution. The mean cloud property obtained from the sophisticated prognostic schemes in MIROC5 shows good agreement with satellite measurements. MIROC5 reveals an equilibrium climate sensitivity of 2.6 K. which is lower than that in MIROC3.2 by 1 K. This is probably due to the negative feedback of low clouds to the increasing concentration of CO2, which is opposite to that in MIROC3.2.