MAGICC/SCENGEN

Description	MAGICC/SCENGEN is a user-friendly software package that takes emissions scenarios for greenhouse gases, reactive gases, and sulfur dioxide as input and gives global-mean temperature, sea level rise, and regional climate as output. MAGICC is a coupled gas-cycle/climate model. It has been used in all IPCC reports to produce projections of future global-mean temperature and sea level change, and the present version reproduces the results given in the IPCC Third Assessment Report (TAR). MAGICC can be used to extend results given in the IPCC TAR to other emissions scenarios. SCENGEN is a regionalization algorithm that uses a scaling method to produce climate and climate change information on a 5° latitude by 5° longitude grid. The regional results are based on results from 17 coupled atmosphere-ocean general circulation models (AOGCMs), which can be used individually or in any user-defined combination.
Appropriate Use	Can be used whenever future atmospheric composition, climate or sea level information is needed.
Scope	All locations.
Key Output	MAGICC gives projections of global-mean temperature and sea level change. SCENGEN gives the following regional outputs on a 5° latitude by 5° longitude grid: changes in or absolute values of temperature and precipitation, changes in or absolute values of temperature and precipitation variability, signal-to-noise ratios based on intermodel differences or temporal variability, and probabilities of temperature and precipitation change above a specified threshold. The software also quantifies uncertainties in these outputs.
Key Input	Emissions scenarios for all gases considered in the SRES (Special Report on Emissions Scenarios) scenarios: CO_2, CH_4, N_2O, CO, NOx, VOCs, SO_2, and the primary halocarbons considered by the Kyoto Protocol (including SF6). The user also has control over various climate model and gas-cycle model parameters.
Ease of Use	The user-friendly software is largely self explanatory. It comes with a user manual and a technical manual.
Training Required	Requires little training for those familiar with basic climate science.
Training Available	A training course for an earlier version was held in 2000, but there are no plans currently for future courses.
Computer Requirements	Personal computer.
Documentation	Numerous publications in the scientific literature.
Applications	Widely applied in many regions and over a range of climate impact sectors. See References below.
Contacts for Framework, Documentation, Technical Assistance	The primary developer, Tom Wigley, can be contacted at wigley@ucar.edu. See also: http://www.cru.uea.ac.uk/~mikeh/software and http://www.cgd.ucar.edu/cas/wigley/magicc/index.html
Cost	MAGICC/SCENGEN is free.

MAGICC/SCENGEN (cont.)

References	Santer, B.D., T.M.L. Wigley, M.E. Schlesinger, and J.F.B. Mitchell. 1990. Developing Climate Scenarios from Equilibrium GCM Results. Max-Planck-Institut für Meteorologie Report No. 47, Hamburg, Germany. Wigley, T.M.L. and S.C.B. Raper. 1992. Implications for climate and sea level of revised IPCC emissions scenarios. *Nature* 357:293-300. Wigley, T.M.L. 1993. Balancing the carbon budget. Implications for projections of future carbon dioxide concentration changes. *Tellus* 45B:409-425. Raper, S.C.B., T.M.L. Wigley, and R.A. Warrick. 1996. Global sea level rise: past and future. In *Sea-Level Rise and Coastal Subsidence: Causes, Consequences and Strategies*, J. Milliman and B.U. Haq (eds.). Kluwer Academic Publishers, Dordrecht, The Netherlands, pp. 11-45. Wigley, T.M.L. and S.C.B. Raper. 2001. Interpretation of high projections for global-mean warming. *Science* 293:451-454. Wigley,T.M.L., Raper,S.C.B., Hulme,M. and Smith,S. 2000. The MAGICC/SCENGEN Climate Scenario Generator: Version 2.4, Technical Manual, Climatic Research Unit, UEA, Norwich, UK, 48pp. Wigley, T.M.L. and S.C.B. Raper. 2002. Reasons for larger warming projections in the IPCC Third Assessment Report. *Journal of Climate* 15:2945-2952. Other information is given in the atmospheric chemistry, climate projections, and sea level chapters of the IPCC TAR Working Group 1 report, Houghton, J.T., Y. Ding, D.J. Griggs, M. Noguer, P.J. van der Linden, D. Xiaosu, and K. Maskell (eds.). 2001. *Climate Change 2001: The Scientific Basis*. Cambridge University Press, New York.