Statistical DownScaling Model (SDSM)

Description	SDSM is a user-friendly software package designed to implement statistical downscaling methods to produce high-resolution monthly climate information from coarse-resolution climate model (GCM) simulations. The software also uses weather generator methods to produce multiple realizations (ensembles) of synthetic daily weather sequences.
Appropriate Use	SDSM can be used while impact assessments require small-scale climate scenarios, provided quality observational data and daily GCM outputs for large-scale climate variables are available.
Scope	All locations, all sectors.
Key Output	Site-specific daily scenarios for maximum and minimum temperatures, precipitation, humidity. SDSM also produces a range of statistical parameters such as variances, frequencies of extremes, spell lengths.
Key Input	Quality observed daily data for both local-scale and large-scale climate variables to calibrate and validate the statistical model(s). Daily GCM outputs for large-scale variables for future climate to drive the model(s). The current version (2.3) contains observed data libraries for use in model calibration, and GCM data for making future projections, but only for selected regions (currently Europe and Canada). Later versions will expand these data bases.
Ease of Use	The user-friendly software is largely self explanatory. It comes with comprehensive instructions for use.
Training Required	Requires little training for those familiar with climate science but it requires expert knowledge and reiterated efforts to establish realistic and accurate statistical relationships .
Training Available	There are currently no plans for any training 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.
Contacts for Framework, Documentation, Technical Assistance	New users can register and download the software package at https://co-public.lboro.ac.uk/cocwd/SDSM/.
Cost	SDSM is free.

References	Wilby, R.L. and Dettinger, M.D. 2000. Streamflow changes in the Sierra Nevada, CA simulated using a statistically downscaled General Circulation Model scenario of climate change. In: McLaren, S.J. and Kniveton, D.R. (Eds.), *Linking Climate Change to Land Surface Change*, Kluwer Academic Publishers, Netherlands, pp. 99–121. Hassan, H., Aramaki, T., Hanaki, K., Matsuo, T. and Wilby, R.L. 1998. Lake stratification and temperature profiles simulated using downscaled GCM output. *Journal of Water Science and Technology*, 38, 217–226. Wilby, R.L., Hassan, H. and Hanaki, K. 1998b. Statistical downscaling of hydrometeorological variables using general circulation model output. *Journal of Hydrology*, 205, 1~19 Conway, D., Wilby, R.L. and Jones, P.D. 1996. Precipitation and air flow indices over the British Isles. *Climate Research*, 7, 169–183. Jones, P.D., Hulme, M. and Briffa, K.R. 1993. A comparison of Lamb circulation types with an objective classification scheme. *International Journal of Climatology*, 13, 655–663. Rubinstein, R.Y. 1981. *Simulation and the Monte Carlo method*. Wiley, New York. Narula, S.C. and Wellington, J.F. 1977. An algorithm for linear regression with minimum sum of absolute errors. *Applied Statistics*, 26, 106–111.