# Documentation of Scripts and Updates

## UM mods/Hand Edits

**General Warning:** Hand edit scripts are executed when you press the process option in the umui. The scripts will often change the name of the variable (i.e. the name of the umui variable is different to the variable in the namelist). Hence if you are creating an ensemble of simulations from the umui\_jobs, it is important to make sure that you run the hand\_edit\_script manually.

### ~swsvalde/scripts/solar\_orbit\_update and solar\_orbit\_real1950.mod

This update controls the solar constant and the orbital parameters within HadCM3. It enables having a single executable for a range of solar and orbital variability, including transient simulations. The update itself is based on that in FAMOUS, which was adapted from HadGEM2. The mod is controlled by a namelist (NLSTSOLAR) and the hand edit script adds this to the CNTLATM file. The variables that interact with the hand\_edit/mod are added to the Sub-Model Independent -> Script Inserts and Modifications: Defined Environment Variables. These are:

1. SOLAR: This simply changes the solar constant. The default is 1361.0
2. SOLAR\_PERCENT : This changes the solar constant to a % (e.g. 95 means 95% of modern). Default is 100.0
3. SOLAR\_PERCENT\_CHANGE : As above but as a change from modern (i.e. -5 means 5% less than modern= 95%). Default= 0.0
4. SOLAR\_AGE: Calculates the reduction in solar constant based on the specified age in Ma. (i.e. 350 means solar constant appropriate for 350 Ma BP, 97.107% of solar constant). This is calculated by the formula in Gough (1981) equation (1). Default=0
5. YEAR\_ORBIT: Changes the orbit corresponding to xx kyr BP (before 1950) i.e. a value of 12 corresponds 12kyr BP orbit. Orbital parameters are from Berger (1978). Default=0.
6. NOUTPUT\_ORB: If non zero, outputs the current orbital parameters every NOUTPUT\_ORB time steps. File is in $DATAM and is {expt}a#solarorbit.dat. Default=0.
7. ORB\_GAMMA, ORB\_E, ORB\_TAU0, ORB\_SINOBL or ORB\_ARRAY: Using these, it is possible to specify the precise orbital characteristics. Can also specify all four together by providing the ORB\_ARRAY as a comma delimited set of 4 numbers.
8. L\_SEC\_VAR: If .TRUE, then the orbit will vary. Default= .FALSE.
9. SEC\_VAR\_FACTOR: If transient orbital variation, then accelerate orbital changes

NOTE that option (a) can be used in all cases, but you can only choose 1 of (b), (c), or (d).

Similarly, option (e) or option (g) or option(h) and (i) can be used.

1. Quick Work Flow of Running the UM
   * 1. Prepare umui job
     2. Prepare list\_runs data entry and inidata files
     3. Submit job and monitor progress
     4. Add experiment to ftp\_sh.bc4.params
     5. When finished, run:
        1. tidy\_expt
        2. fill\_gaps\_new01
        3. submit processing, which runs the make\_all script which runs:
2. Script Description