

RT Model README – C. L. Smith, Aug 2018

* **bb_gridprep.py** (python script) prepares an input grid for you to run. It pulls inputs from the abundances (derived from reverse using the 880nm observations), the flux vs Ls (taken from the standard solar spectrum), and the sunpaths (from omniclock). These are all provided to you as well. Note the output file name - you'll need it in the next step.

```
>> python bb_gridprep.py
```

* **billiard_ball_runner-savesky.sh** is a bash script and runs the D&A code. It sets up the namlist using the grid of inputs (file produced above – examples can be found in the “inputs folder”). It also then runs the **bb_basic_outputmaker.py** to save the required files from the produced INTENSI.OUT, and resets everything at the end. It also moves “all_outputs.txt” to the folder name specified at the command line. Finally, it also copies the whole Intensi.OUT to the relevant folder for future use and renames it according to the zenith angle:

```
>> ./billiard_ball_runner-savesky.sh Input.txt  
RequiredNamlist.int OutputFolder
```

* **bb_basic_outputmaker.py** produces a basic csv output file containing all the information you'd need for future modelling: ls, lat, lon, az, zen, ltst, dfds, fds, fus. Note lon is always 0 in this code as I'm using zonal means. A line is appended to “all_outputs.txt” with every iteration.

The basic “XYZ/all_outputs.txt” contains everything you'd need to compute the incident flux on a flat unsheilded area of ground (simply add/subtract and integrate). For the whole sky, integrated over the whole day for a specific location, you need additional codes.

* **mules_day_converter.py** takes the instantaneous sky maps from the given XXX_INTENSI.OUT files and the all_outputs.txt file and integrates them with respect to solid angle and time, re-samples the sky to a uniform map and outputs the entire day's sky in slightly bizarre units of J/m² within the given band but with no cosine correction for the incident angle with the surface (as these were being used as input to the crack orientations code so couldn't use a standard set or the MU values given). It also plots and saves sky maps for each day for both the direct Solar flux and the scattered light flux in each band.

```
>> python mules_day_converter.py FolderName/
```

* **bb_geocrack_compiler.py** takes each of the individual band outputs and collates them into a single “whole_band” version so you have the only a single sky map for scattered and direct for each latitude at a given solar longitude. I used these as inputs to my geocrack code.

```
>> python bb_geocrack_compiler.py
```