# Manual for probabilistic studies with Eject! for Matlab

To perform the probabilistic study, download all files from this resource and the resource "Eject! for Matlab" (Strehlow et al., 2019), and store them in one folder on your computer.

The script "Probabilisticstudy.m" calls all the functions and performs the probabilistic study. The following diagram describes the workflow within the script:
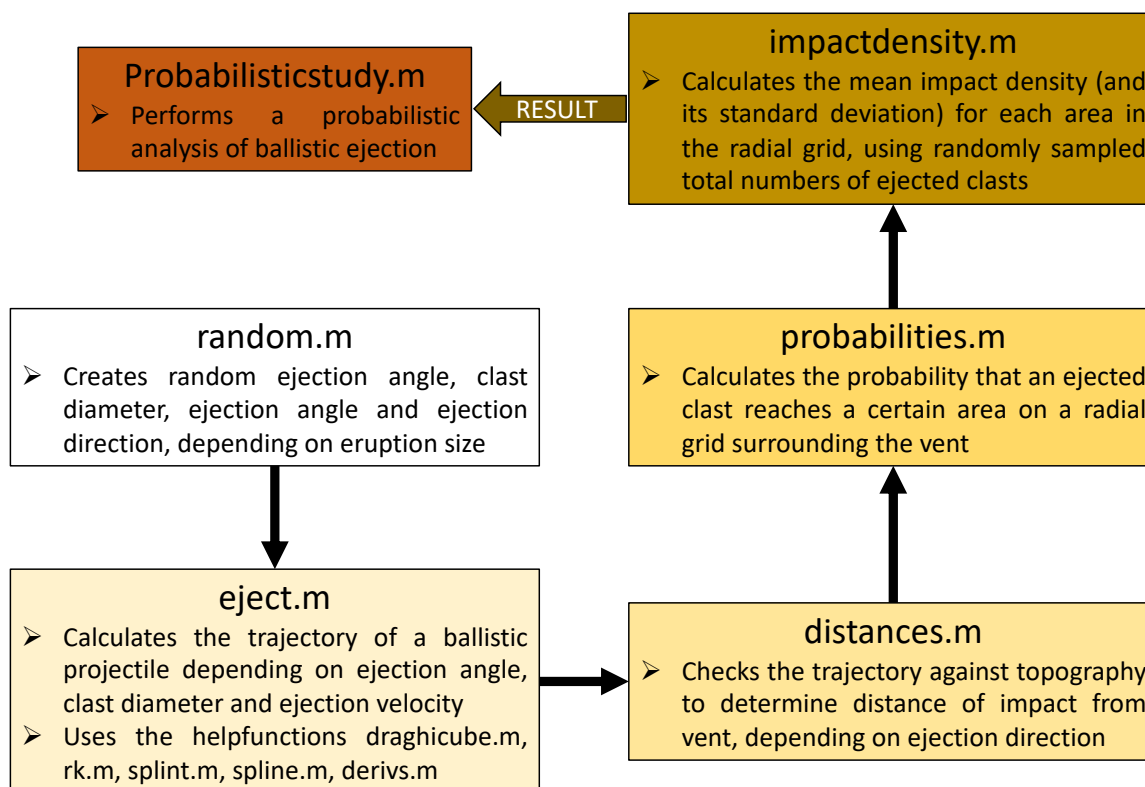


An example for the use of this workflow and a detailed description of the method can be found in Strehlow et al. (2017). The core-function is eject.m, which is a translation of the Visual Basic code of Eject! (Mastin, 2001; 2011) into Matlab.

The scripts have detailed comments and should be self-explanatory. Please remember to adjust input parameters to your specific volcano where required. In addition to those described in the "Manual for Eject! for Matlab" (Strehlow et al., 2019), these may include:
- the ranges for ejection velocities and definition of eruption scales
- the truncation of sampled ejection angles (depending on the topography, ejected clasts may need a minimum ejection angle to make it out of the crater)
- sampled clast diameters
- the definition of the radial grid - in particular the distinction into 4 sectors (we distinguish ejection towards the north, south, east or west of the crater) may need to

be adapted, which then also means to adjust the sampling of ejection angles (which gives you the ejection direction)
- the interval which is sampled for the total number of ejected clasts

**References:**

Mastin, LG (2001) A simple calculator of ballistic trajectories for blocks ejected during volcanic eruptions: U.S. Geological Survey Open-File Report 01-45, 16p; https://pubs.usgs.gov/of/2001/0045/.

Mastin, LG (2011) eject model. https://vhub.org/resources/455.

Strehlow, K, Sandri, L, Gottsmann, JH, Kilgour, G, Rust, AC, Tonini, R (2017) Phreatic eruptions at crater lakes: occurrence statistics and probabilistic hazard forecast. Journal of Applied Volcanology, 6 (4), DOI 10.1186/s13617-016-0053-2.

Strehlow, K, Mastin, LG, Sandri, L, Gottsmann, JH, Kilgour, G, Rust, AC, Tonini, R (2019) Eject! for Matlab. https://vhub.org/resources/4543.