Tower Hill Volcanic Complex is a monogenetic nested maar-cone complex located in the Cainozoic Newer Volcanics Province of southeast Australia. Like many other basaltic monogenetic volcanoes, Tower Hill has displayed varying eruptive styles, both magmatic (Strombolian, fire fountaining) and phreatomagmatic. During its early history, Tower Hill fluctuated several times between magmatic and phreatomagmatic styles before eventually “drying out”, rather than simply “drying out” over the course of the eruption due to diminishing water supplies (typical of many eruptions). An extensive field study involving mapping, logging and correlation of stratigraphic sections, grain size and componentry analysis, and a detailed study of lithic populations and ballistics has been undertaken to reconstruct the eruptive history and address the cause of the fluctuations displayed. Stratigraphic analysis has revealed three main sectors in the maar rim; to the northwest, the east and the southeast. The rim sequence is thickest in the eastern sector where fall deposits appear to have been strongly affected by prevailing wind direction. Ballistic trajectories indicate migration of the active vent through time, coupled with a deepening of the groundwater interaction level, evidenced by lithic populations throughout the sequence. The principal hazards associated with Tower Hill were far flowing base surges (>10kms), and an Eyjafjallajökull-like ash plume that would have been dispersed over the current site of Melbourne.