

Figure S-1. Velocity models used in this study. Model A was used for locations with Hypo71 [Lee and Lahr, 1975], and was derived from profile V by Berckhemer *et al.* [1975]. Model B, a smoothed version of Model A, was used for locating earthquakes based solely on $S - P$ phase delays at three stations (SM1, SM2 and SM4) with the probabilistic approach of Tarantola and Valette [1982]. S -wave velocity is deduced using a V_P/V_S ratio of 1.77.

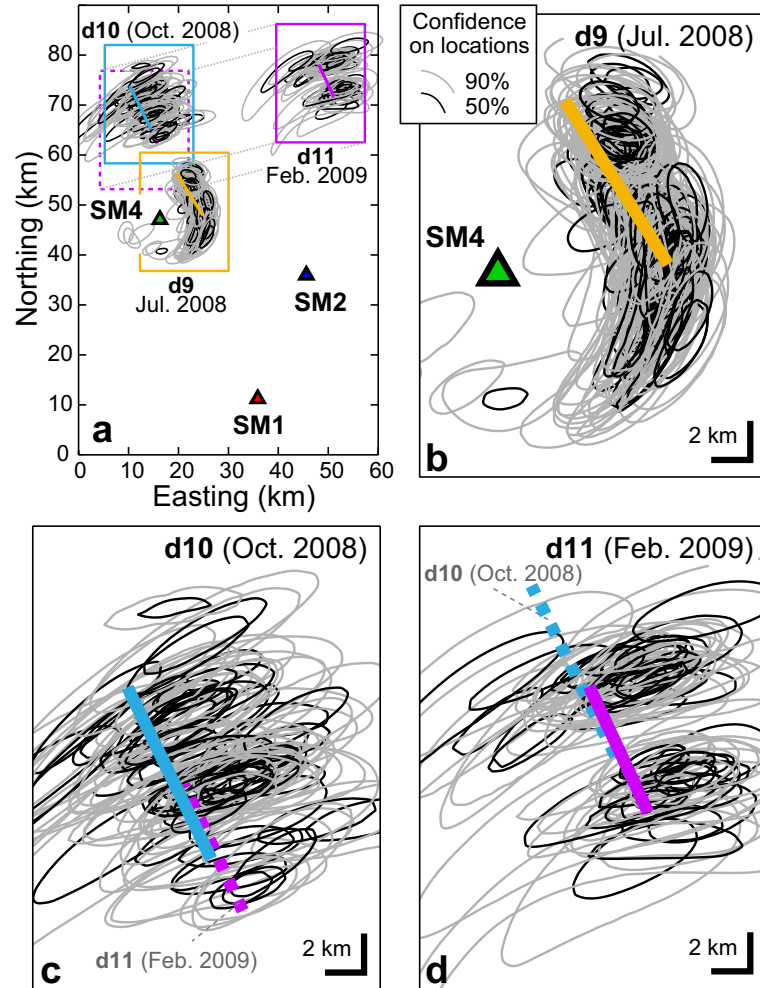


Figure S-2. Uncertainty on earthquake locations determined by inversion of $S - P$ phase delays, assuming that earthquakes occur at a fixed depth of 5 km. The ellipses demarcate the limit of the region where the earthquake is expected to have occurred, with the size of the region depending on the confidence in the estimation of earthquake location (black: 50%; grey: 90%). In **a**, the geometry of the network is shown, together with the location of the three dikes studied here (note that dike d11, which overlapped with dike d10, has been shifted toward the NE to enhance clarity). **b**, **c** and **d** show each dike in detail. Thick color lines represent the traces of the dikes at the surface, deduced from InSAR [Grandin *et al.*, 2010b]. Different earthquakes yield different sizes of the ellipses because errors on phase pickings are not homogeneous within the catalogue. The shift of earthquake locations toward the SW at the southern end of the July 2008 dike likely results from poorly resolved phase pickings at SM1, whereas the epicentral distance relative to less distant stations SM2 and SM4 is better constrained.

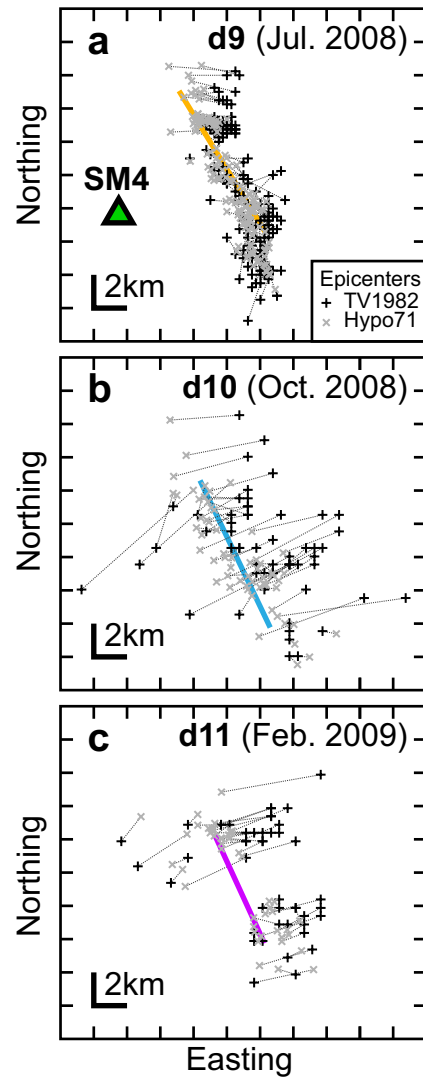


Figure S-3. Comparison of the epicentral locations determined with Hypo71 (grey \times) *versus* locations determined solely with S-P phase delays (black $+$).

Table S-1. Station-epicenter distances (Δ_{SMx}) and largest azimuthal gap between azimuthally adjacent stations (GAP) for the three dikes presented in this study.

Dike		GAP ($^{\circ}$)	Δ_{SM1} (km)	Δ_{SM2} (km)	Δ_{SM4} (km)
d9	(July 2008)	190–287	34–49	21–34	6–11
d10	(October 2008)	247–332	55–71	39–55	15–31
d11	(July 2008)	247–331	52–64	36–50	13–24