

Fig. DR1. Flowchart showing the main processes of our statistical petrology method

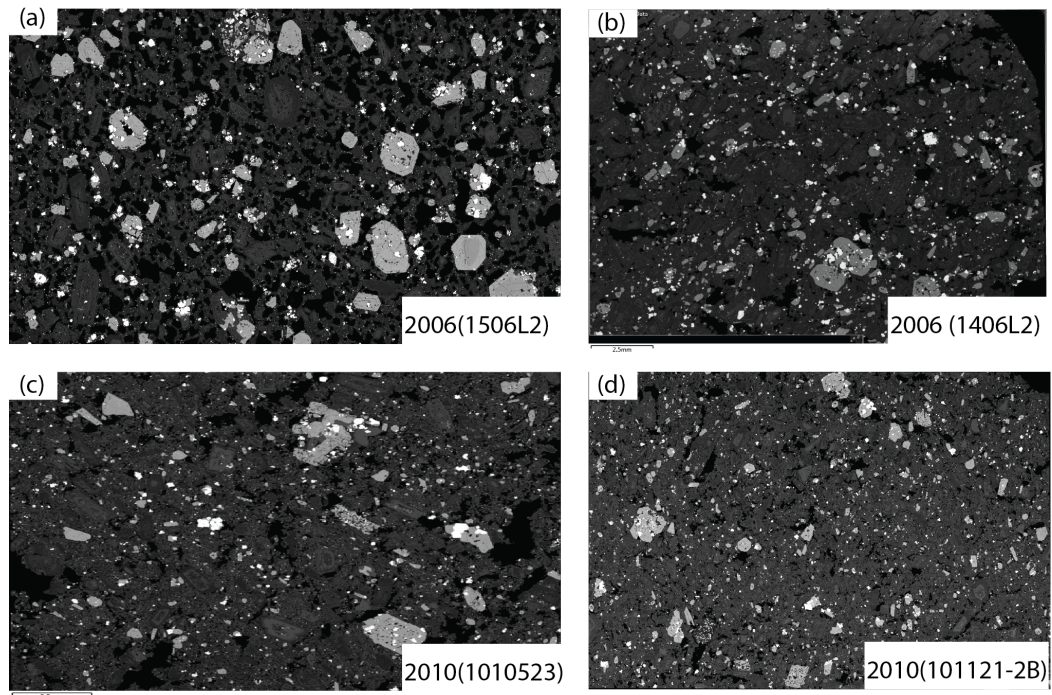


Fig. DR2. (a) Whole thin section BSE image of sample 1506L2 of eruption 2006, we use SEM to get thousands of small BSE images and make them into one large area image. And we use CEMin 1.0 outline 244 plagioclase; (b) whole thin section of BSE image of sample 1406L2 of eruption 2006. Total number of crystals is 236. (c) whole thin section BSE image of sample 1010523 of eruption 2010, which provide 273 plagioclase. (d) whole thin section of BSE image of sample 101121-2B. total number of crystals is 283.

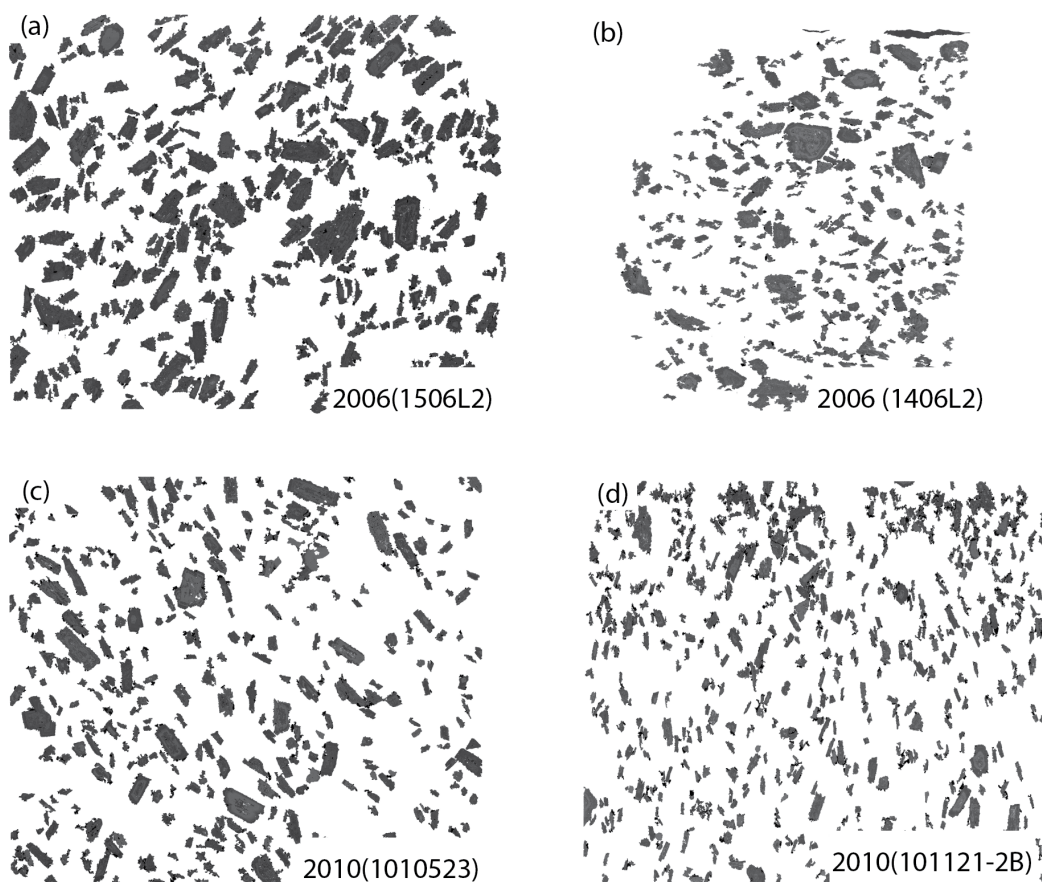


Fig. DR3. (a) plagioclase outlined from sample 1506L2 of eruption 2006; (b) plagioclase outlined from sample 1406L2 of eruption 2006. Total number of crystals is 236. (c) plagioclase outlined from sample 1010523 of eruption 2010, which provide 273 plagioclase. (d) plagioclase outlined from sample 101121-2B. Total number of crystals we used for our software is 283.

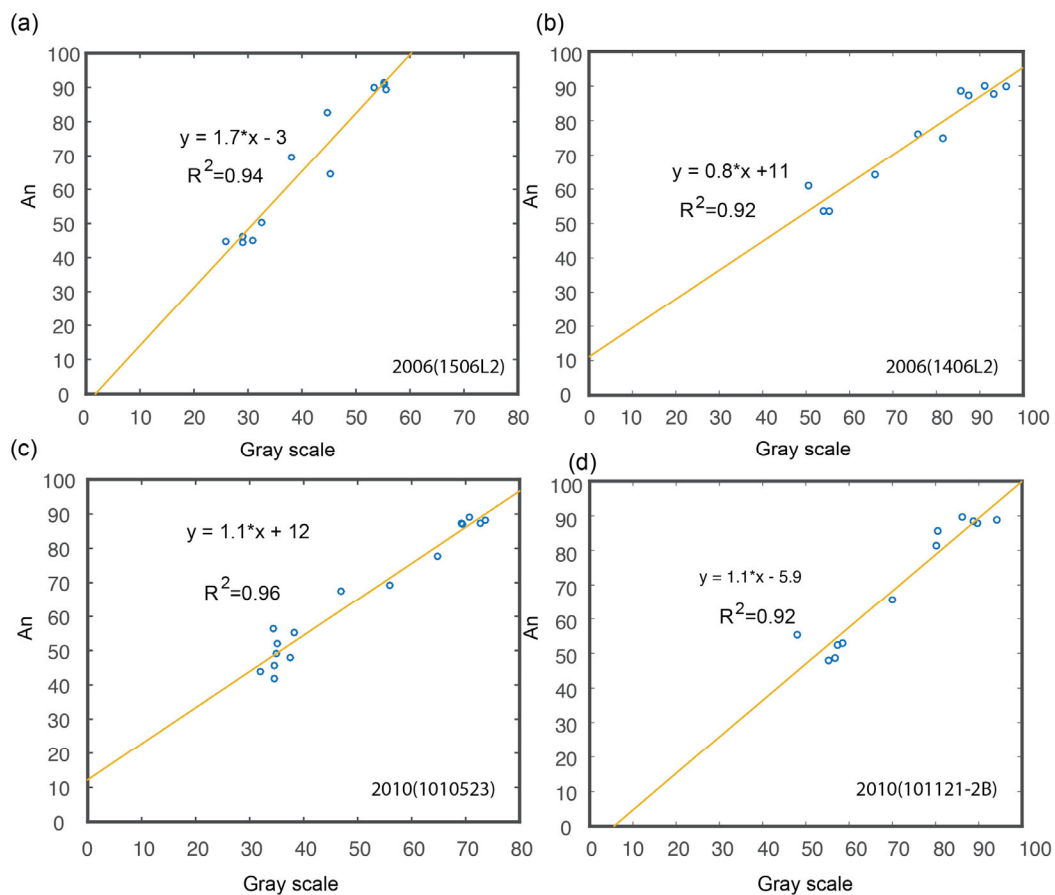
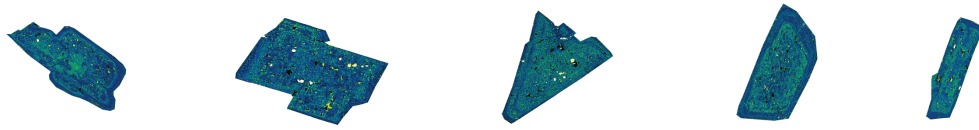
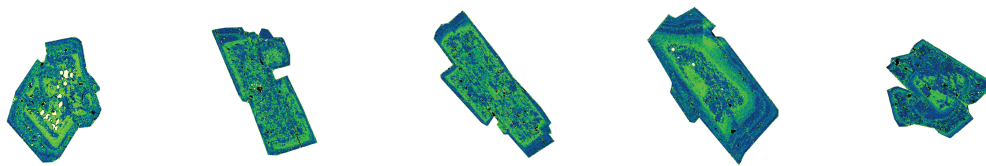


Fig. DR4. Using the linear relationship between gray scale and anorthite content we could transfer the gray scale distribution into anorthite compositional distribution. The figure show the relationship for 2006 and 2010 eruption determined by EMPA data.

Ideal sections of 2006 eruption



Ideal sections of first group of 2010 eruption



Ideal sections of second group of 2010 eruption

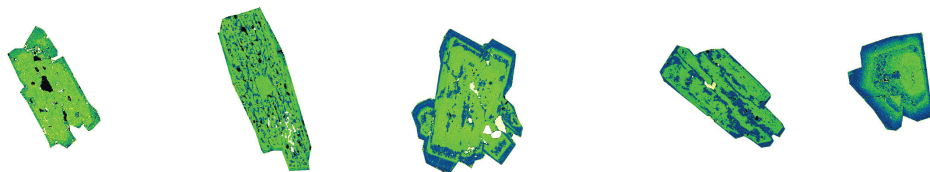


Fig. DR5. ideal section determined by Cheng et al. 2017.

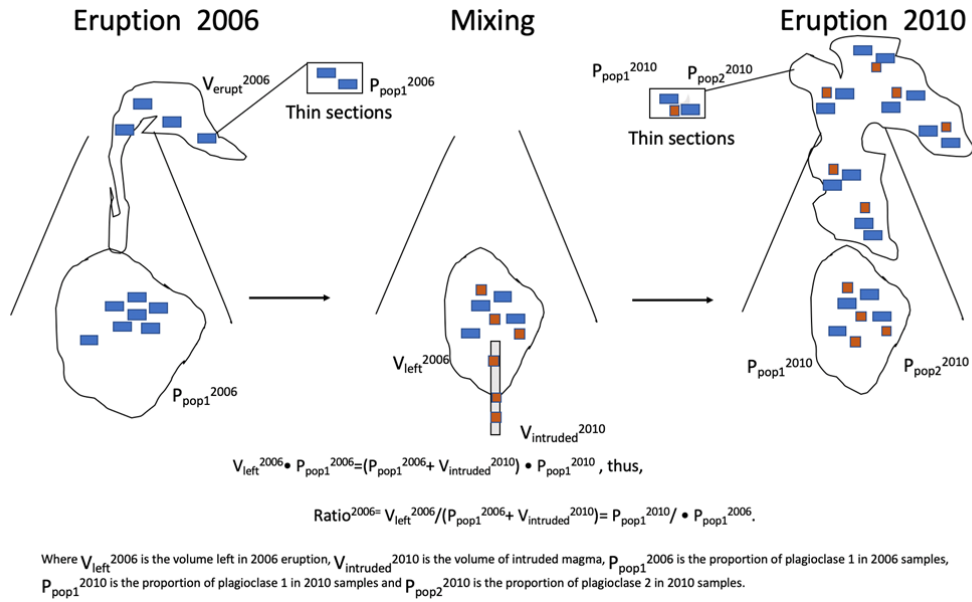


Figure DR6. The method to calculate the volume ratio of two magma during mixing. The proportion of plagioclase is determined from thin section by image analysis. The ratio of two crystal population is 30%-70% by our petrological method.