## Διάλεξη – Lecture

Σχολή Μηχανικών Μεταλλείων - Μεταλλουργών (School of Mining & Metallurgical Engineering) Τετάρτη, 1<sup>η</sup> Μαρτίου, 2017 – Ώρα 13:30 (Wednesday, 1<sup>st</sup> March, 2017 – 13:30) Αίθουσα 101 Μεταλλειολόγων (Lecture Room 101)

## Quantitative textural (microstructural) analysis of rocks and materials: what can it tell us about solidification?

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Quantitative Textural Measurements in Igneous and Metamorphic Petrology



Quantitative textural analysis is based on quantification of aspects of rock texture (geological definition = microstructure), such as crystal or grain size, shape, orientation, position, and neighbours. The subject was first developed by engineers, then applied by geologists to rocks and has now started to return to metallurgical studies.

**Textural measurements** are ideally made in 3D using X-ray tomography. However, this technique produces phase maps, as it is not capable of distinguishing a touching crystals of the same phase. Maps of individual crystals (crystal maps) give more information, but generally can only be obtained from 2D sections, and stereological corrections are necessary.

**Rock textures** develop during solidification by a combination of **kinetic growth** and **mechanical processes** whose products can be modified by equilibration. Clear examples of kinetic textures are seen in the **phenocrysts of some lavas** and **impurities in steel**. Mechanical processes include **precipitation** of crystals to form **cumulates**, like anorthosites. Finally, equilibration of existing textures is seen in most plutonic rocks. The presence of multiple phases, such as in granites, can indicate very interesting combinations of processes. Normally, we can only see the final texture, but in some cases the **solidification path** can be clarified using intermediate textures preserved in **oikocrysts**.

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