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Automated quantification of fabric anisotropy and inhomogeneity with the AMOCADO toolbox

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Fabric anisotropy and inhomogeneities within a material's fabrics are fundamental characteristics of many geomaterials. For a comprehensive research of the processes that form these fabrics, means of quantitative fabric characterization are required.

While first methods that specifically focus on analyzing anisotropy and inhomogeneity have been suggested in the past, their application has been limited to single opera, as their manual execution oftentimes requires an unreasonable expenditure of time. From this motivation, we have automated these methods. The resulting toolbox AMOCADO allows for a time-efficient deployment of a growing number of different methods.

As the implemented methods are applicable for a wide range of fabrics from various origins, we illustrate the knowledge that can be gained from their utilization with two examples on different scales: (1) We show that analyzing grain boundary patterns with a combination of different quantification methods provides insight into the complex interaction of different pattern-forming processes, such as crystal rotation during flattening and grain boundary migration. (2) With a quantitative evaluation of the inhomogeneity within a crack pattern we can detect changes that were directly related to the pattern forming processes.