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Release of program Win-Tensor 4.0 for tectonic stress inversion: statistical expression of stress parameters

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The Win-Tensor program is an interactive computer program for fracture analysis and crustal stress reconstruction, freely distributed to the scientific and academic community and widely used by structural geologists. It was developed with a constant feed-back from the users and is regularly upgraded. Version 4.0 released in January 2012 provides as a new feature the standard deviation of the horizontal stress axes (SHmax/SHmin) and the stress regime Index R'. The latter expresses the relative stress magnitudes and the nature of the vertical stress in a continuous scale, ranging from 1 to 3.

Computation of the standard deviations is based on the examination of all possible reduced stress tensors for a particular stress solution obtained from the inversion of fault-slip or focal mechanism data. They are defined by combining the possible values of each individual stress axes (sigma 1, sigma 2, sigma 3) and the stress ratio R = (sigma2-sigma3)/(sigma1-sigma3). For each possible reduced tensors, the horizontal paleostress directions (SHmax/SHmin) and regime (R') are computed and the related 1 sigma standard deviations determined. This way, the 4 dimensions of the reduced stress tensor are reduced to a two dimensional expression with is commonly used to depict the horizontal stress trajectories as in the World Stress Map project. This procedure has been implemented for the three different methods for reconstructing the reduced stress tensors in Win-Tensor: PBT Right Dihedron and Rotational Optimisation. The advantages of this statistical expression of stress parameters are demonstrated using practical examples.

Win-Tensor program can be downloaded from the Tensor web site: http://www.damiendelvaux.be/Tensor/tensor-index.html