# Elastic Anisotropy of Core Samples from the Taiwan Chelungpu Fault Drilling Project (TCDP): Direct 3-D Measurements and Weak Anisotropy Approximations

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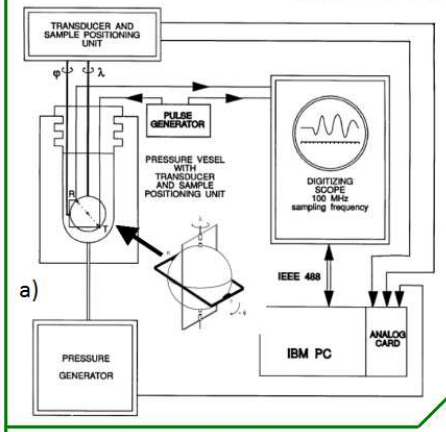
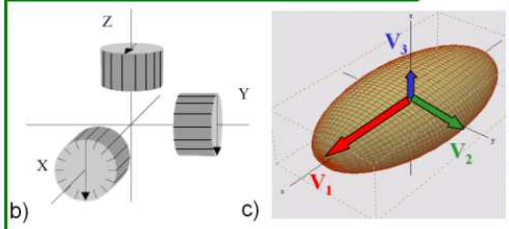
## METHODOLOGY




### MEASUREMENTS ON SPHERES

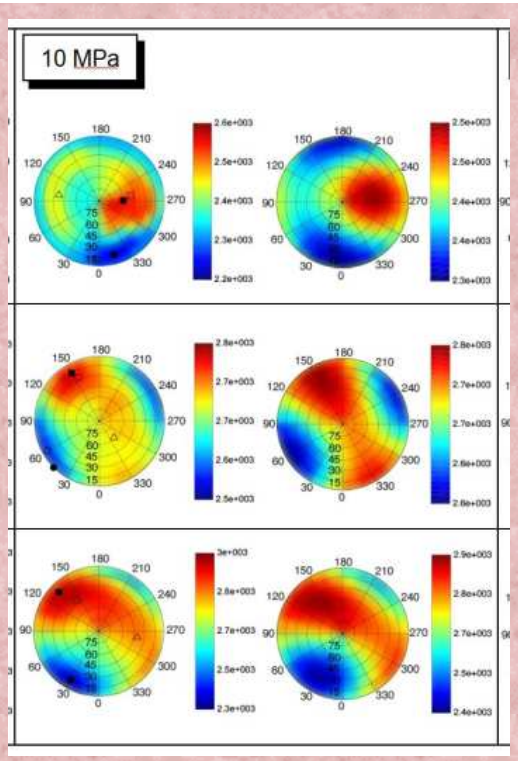
Velocity measurements on spherical dry samples were conducted using the experimental facilities at the Geophysical Institute of Prague (a). Two ultrasonic transducers, one transmitter (T), one receiver (R) are mounted on a frame which can rotate about two perpendicular axes (a) defining the angles λ (longitude) and ϕ (latitude). Typically an angular step (Δϕ or Δλ) of 15° is imposed in the latitude and longitude, which would allow one to acquire a total of 132 independent measurements. Confinement of this experimental device inside a pressure vessel allows one to characterize the velocity anisotropy at confining pressures ranging up to 400 MPa (Pros et al., 2003).



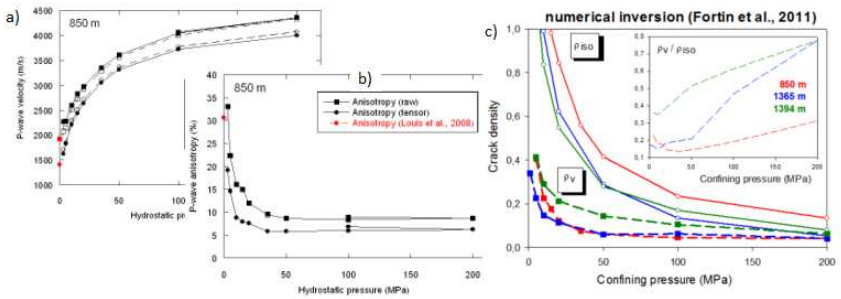

### TENSOR APPROXIMATION

Louis *et al.* (2003) propose to measure P-wave velocities across several diameters in three samples cored in mutually orthogonal directions (b). The 21 independent velocities permits the estimation of eigenvalues and eigenvectors of a velocity second-rank tensor which can be represented in 3D on an ellipsoid (c). The advantage of the tensorial approach is that, firstly, it is simpler than estimating the elastic fourth rank tensor, and secondly there is no need to machine spherical samples.

HOW DO BOTH METHODS COMPARE ?




## EVOLUTION OF VELOCITY & CRACK DENSITY




## AUTOMATIC SETUP