

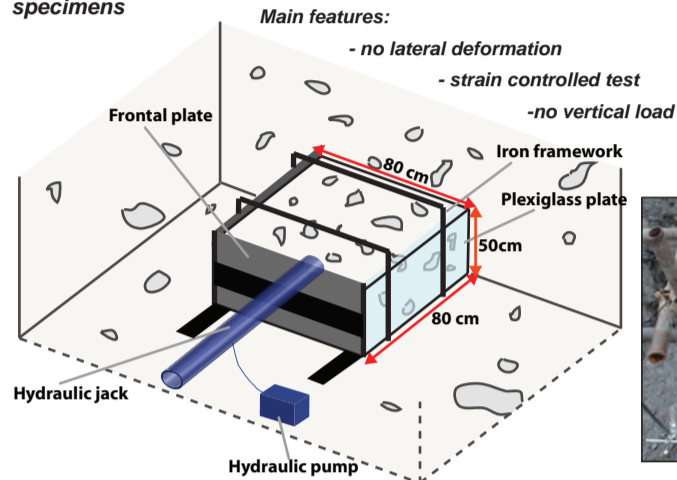
# Advanced methods for the characterisation of block-in-matrix rocks (bimrocks)

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## BimTest: a non-conventional in situ shear test for the mechanical characterisation of bimrock shear strength

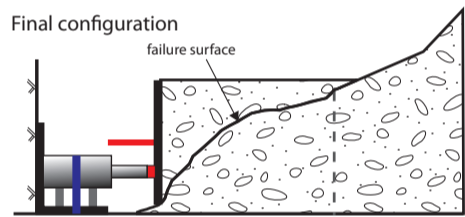
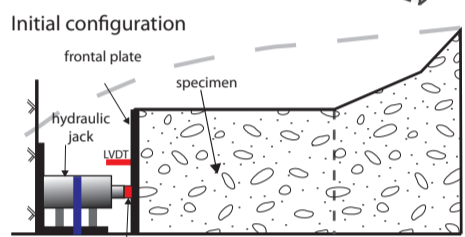
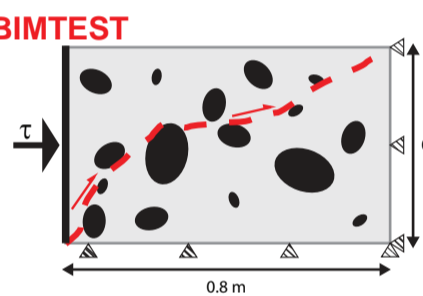
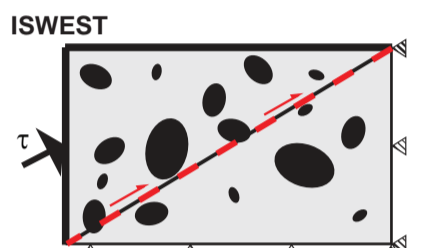
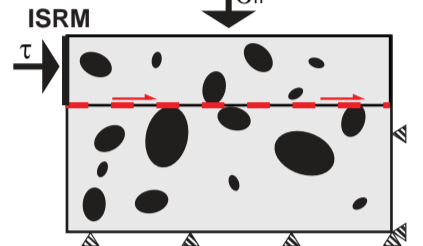
The BimTest has been specifically designed in order to investigate the mechanical behaviour of bimrocks by properly taking into account the influence of blocks and namely to overcome the size limitations of laboratory specimens



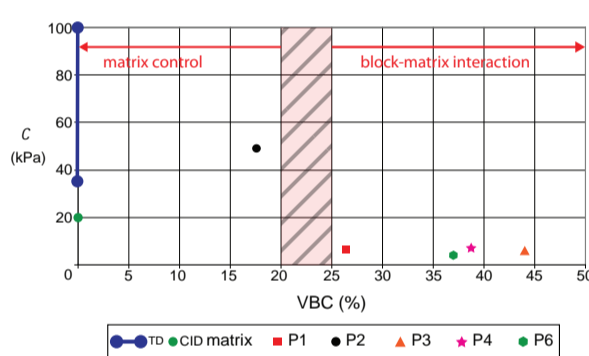
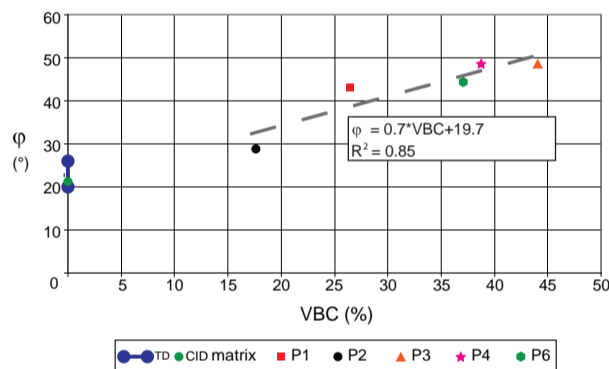
The failure surface is free to grow inside the specimen along tortuous paths: the test properly takes into account the strength increase due to the presence of blocks. In this way the test differs from the standard ISRM in situ shear test as well as the ISWEST wedge shear test

Beginning of failure

End of test



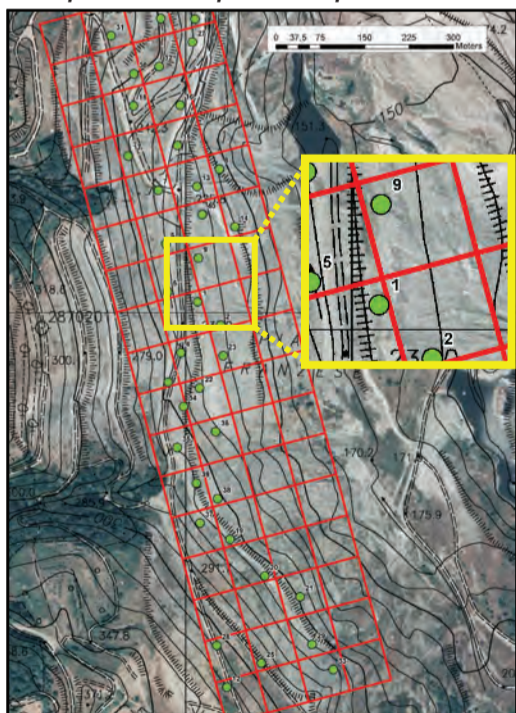
Determination of the Volumetric Block Content (VBC) inside the tested specimens through large-size in situ sieving tests and correlation with strength parameters ( $c, \phi$ )



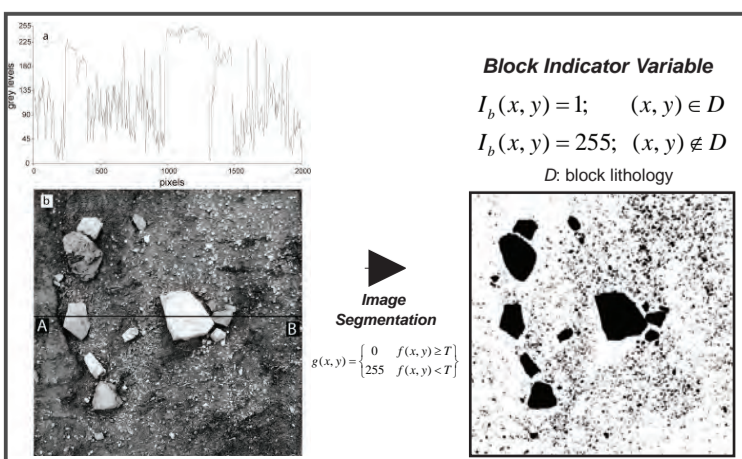
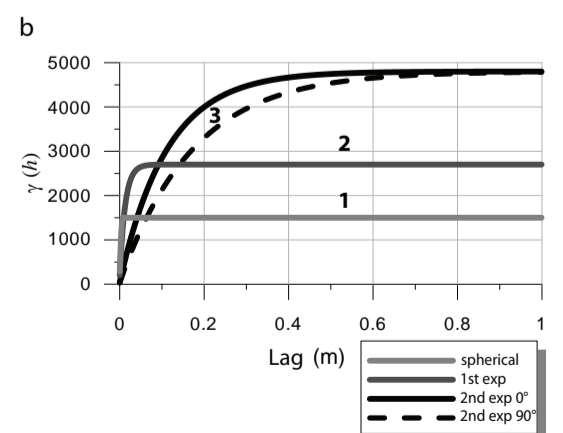
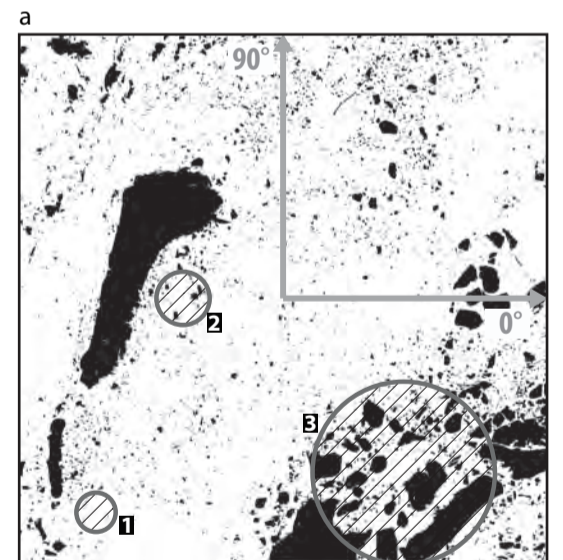
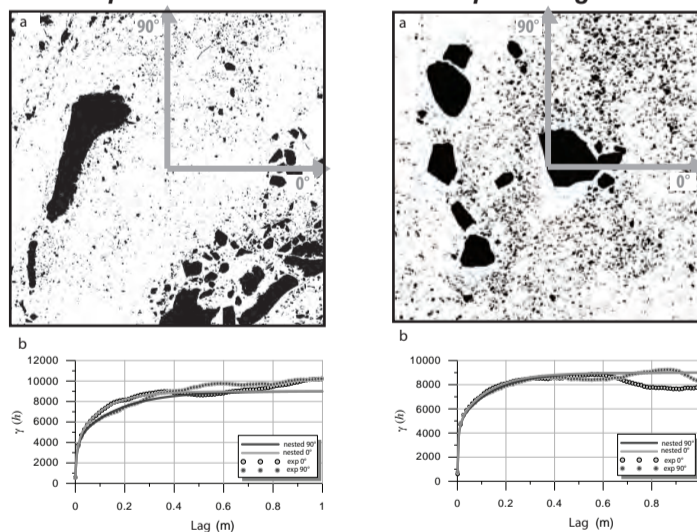
## Geostatistical analysis of block indicator variable $I_b(x, y)$

Stratified Sampling of bimrock outcrop exposures by means of high-definition digital camera.

Each picture encompasses a square area of 4 m<sup>2</sup>



Experimental and nested anisotropic variograms



Three common elementary models with variable sills:

- spherical model at small scale, always isotropic, with a constant range of 8 mm;
- 1st exponential model at medium scale variability, always isotropic, with a practical range between 11 and 15 mm;
- 2nd exponential model at large scale variability, with a practical range between 30 and 300 mm. This model can show a geometric anisotropy.

- the spherical model takes into account the shape and spatial variability of the calcareous fragments below the block/matrix threshold (set "1");
- the 1st exponential model refers to the variability of small blocks, close to the block/matrix threshold, with an average size of about 1 cm (set "2");
- the 2nd exponential model expresses the variability of medium-large blocks, with an average size between 3 cm and 30 cm (set "3").