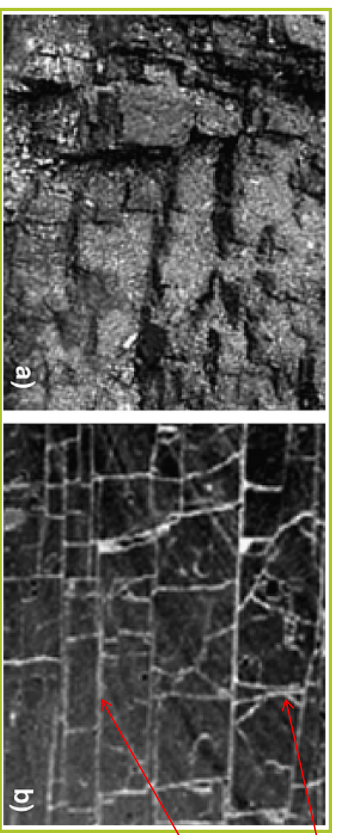


Coal: permeability-stress-strain behavior of cleats

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INTRODUCTION

1. Coals are naturally fractured methane reservoirs in which fractures and cleats govern gas transport.
2. Changes to cleat geometry directly effect reservoir permeability and hence gas production.
3. Dynamic stress changes, which occur during reservoir drawdown alter the cleat apertures and flow paths.
4. This poster examines this behavior in order to provide methods for understanding and predicting these outcomes.



Coal structure: a) bulk seam b) close-up of cleat system

AIMS

Permeability of Coal seam gas reservoir

To relate coal's permeability (k) to cleat width (b), effective stress (σ) and mechanical strain (ϵ).

$$k = f(b) \quad b = f(b_0, \sigma, \epsilon)$$
$$Q = \frac{kA\Delta P}{\mu L} \quad V = \frac{b^3}{12\mu} \frac{\Delta P}{L}$$

based on parallel flow model,

$$k = \frac{b^3}{12a}$$
$$k = k_0 \left(1 - \frac{\sigma}{E}\right)^3 \left(\frac{\eta_0}{\eta}\right)$$

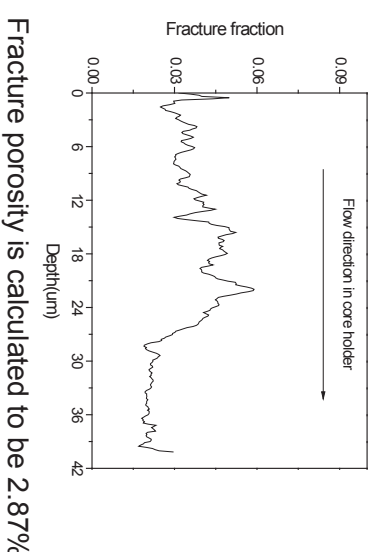
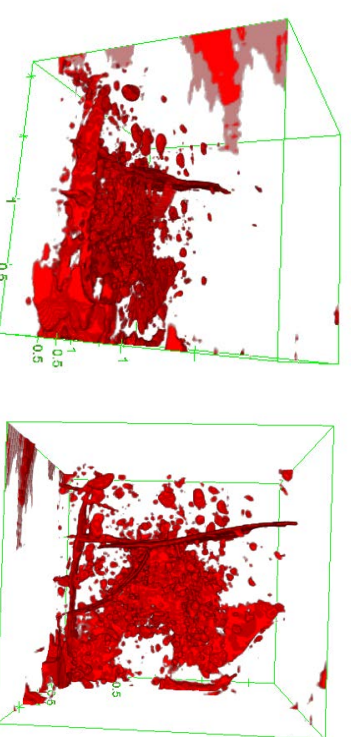
SAMPLE DETAILS

Density, pore volume and porosity of samples by He pycnometer and Mercury porosimetry

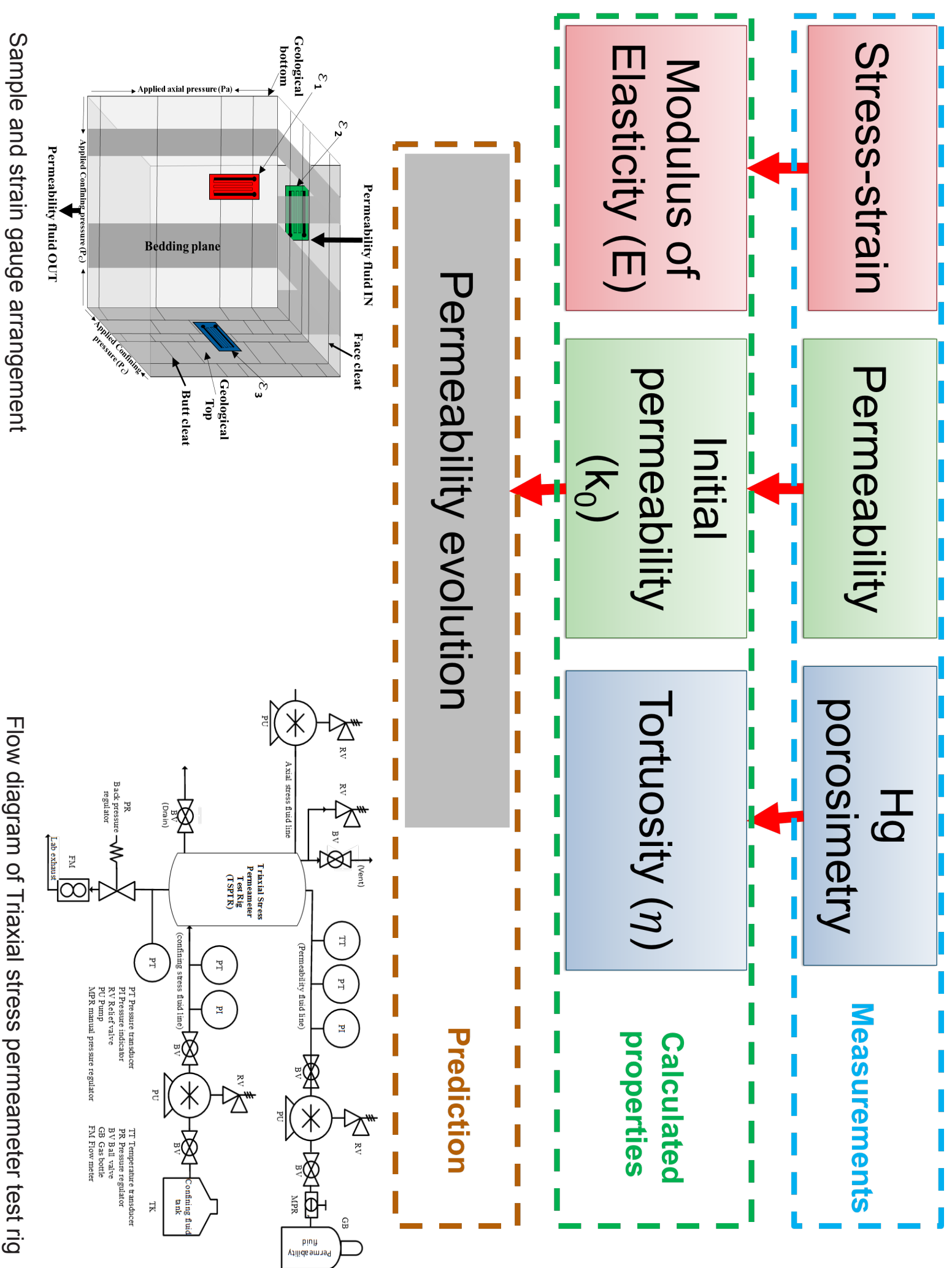
Skeleton density (g/cm ³)	Bulk density (g/cm ³)	Pore volume (cm ³ /g)	Total accessible porosity (%)
1.5033	1.4012	0.048	6.79



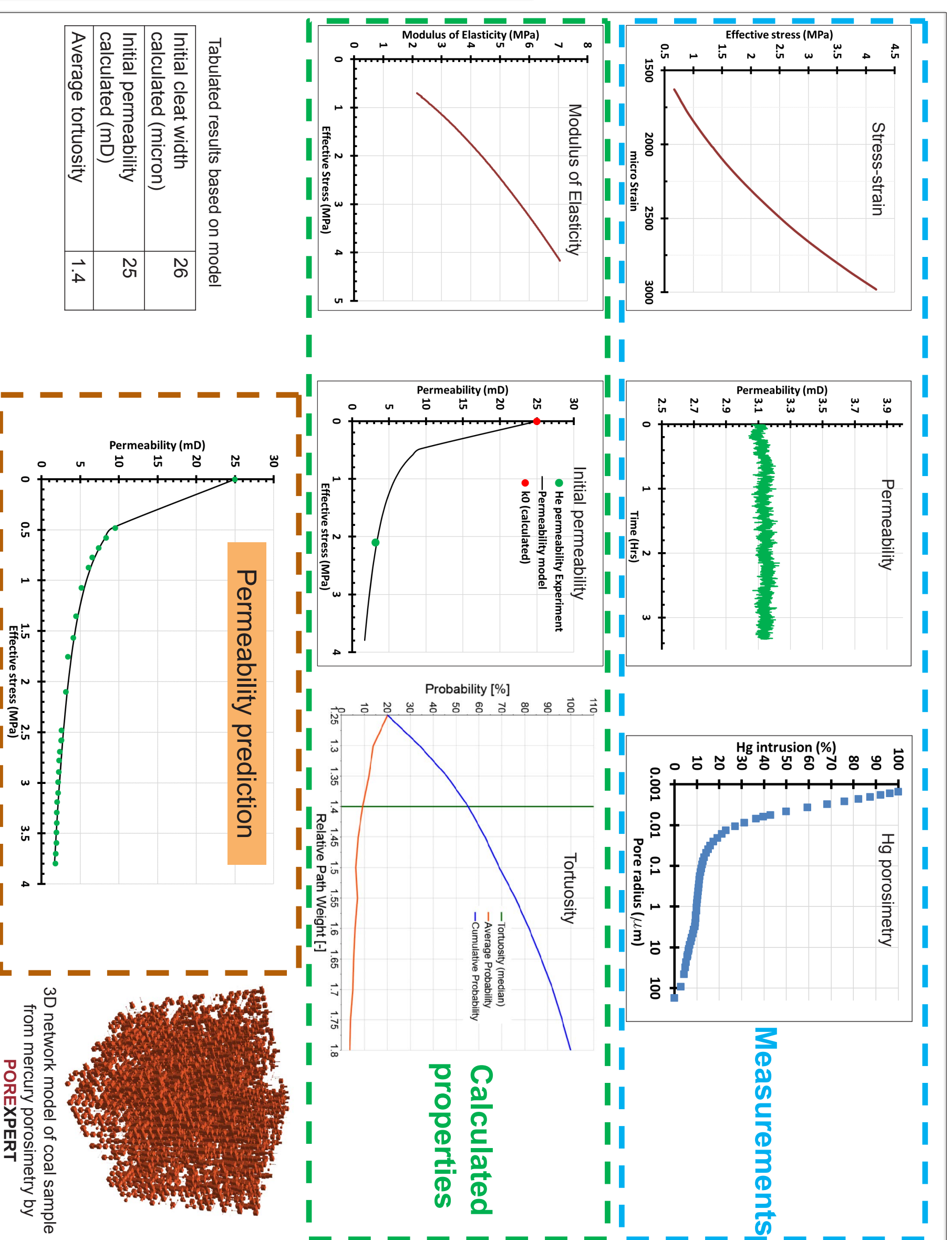
40 mm cubic coal sample



METHODOLOGY



RESULTS



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