

# Use of Outcrop Data to Constrain Reservoir Properties of Deep-Marine Mass-Transport Deposits in the Subsurface: Core- to Seismic-Scale

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We present an integrated approach to the study of mass transport deposits in deep marine environments, using outcrop observations ranging from meso- (core) scale to macro- (seismic) scale from the Guandocól Formation, Carboniferous of La Rioja province, Argentina; the Marnoso Arenacea Fm, Miocene of northern Italy; the Hecho Group, Eocene of northern Spain and the Fossil Bluff Group, Jurassic of Alexander Island, Antarctica.

Using a combination of seismic forward modeling (see companion abstract), core studies, and field techniques such as sedimentary logging, structural measurements, and digital interpretation of photomosaics, we identify various styles of mass transport deposits as reflected in meso-scale (outcrop/core) texture and structure and macro-scale (seismic) structure and lithology distribution. We are able to generate architectural models for the different types of mass transport deposits (e.g. slumps, slides, debris flows) from outcrop data. From meso-scale outcrop measurements we calculate the bulk permeability for examples of the different styles of deposit, based on statistical transformations from 2-D to 3-D. We then generate multi-dimensional diagrams which identify the range of core-scale parameters that differentiate connected from non-connected volumes of reservoir lithologies within an MTD. Finally we link these back to seismic scale properties, and make comparison with high-resolution 3-D seismic data from deep marine systems.