



Supplementary material 3. Graphs of horizontal air permeability against helium porosity for all of the conventional core analysis data in the Donan and Lochranza fields. (a) Comparison between the Donan and Lochranza fields suggests a minor reduction in permeability in the main sands, which plot in the upper right quadrant. Unintentional sampling bias explains the disproportionate number of reduced permeability samples recorded in the Donan Field (Dumbarton) wells, which plot in the lower right quadrant. (b) Amalgamated Channel Sheet samples dominate the dataset and have the best reservoir quality. A minor reduction in permeability is observed in the liquefied caps of massive sands whilst pervasive calcite cements significantly reduced both porosity and permeability. (c) A slight reduction in porosity with a significant reduction in permeability is seen in clast rich muddy sandstones, within Layered Sheet samples. (d) Porosity and permeability is retained in injected sands (after [Ings et al. 2015](#)).