

Sample: TSC47068; Location: Pelican-5, Core 2; 2869 m

Rock Name:

Compact lithic sandstone with microstylolites

Hand Specimen:

A buff to cream coloured fine-grained sandstone which contains discontinuous dark brown microstylolitic bands at right angles to the length of core.

Thin Section:

An optical estimate of the constituents gives the following:

	%
Quartz	85
Lithic fragments	7
Pores	5
Carbonate	2
Feldspar	<1
Mica	Trace
Authigenic kaolinite	Trace

Rigid detrital grains of quartz and feldspar are well sorted about an average size of 0.15 to 0.2 mm. Grain boundaries show considerable modification by post-deposition effects and long and somewhat curved boundaries are fairly common. Overgrowths are seen on only a small proportion of the quartz grains and it is not likely that the development of these overgrowths has contributed much to the porosity reduction. The rock contains a significant proportion of clay and fine-grained constituents and these are interpreted as being derived entirely from original lithic fragments. Much of this material in the thin section is rather turbid and grey but shows variations in both the relative proportions of quartz and phyllosilicates and in average crystal size. There appears to be a considerable amount of fine-grained quartz-rich lithologies some of which are clearly chert but others are probably fine-grained metasediments with a relatively siliceous composition. Other lithic fragments are richer in mica and what appear to be illitic phases and some of these, particularly, show the effects of compression between the more rigid quartz grains. It is thought that the abundance of this clay and the clastic deformation during compaction have had relatively large effects in reducing the original porosity.

The rock does contain small amounts of authigenic kaolinite and of a carbonate mineral. The latter is also distinctly fine-grained and appears to form as a replacement product of some of the finer grained lithic fragments rather than being genuinely a pore fill constituent. The carbonate is particularly abundant in some of the microstylolitic zones where it occurs in fine-grained aggregates with micas and heavy minerals particularly.

Pores are generally relatively small and widely scattered but appear to be of secondary rather than primary origin. Apart from the possibility that they represent sites of preferential dissolution of clay, it is not clear what the origin of these secondary pores is.