

Illite or kaolinite may be deposited as the primary clays. As non-swelling clays they have very little intraparticle water. These clays dewater by loss of interparticle water through compaction. Again, if the hydraulic conductivity of the clays is lower than that required to efficiently flush the water, then these clays will be geopressed. Non-swelling clays, as stated above, are geometrically more compact than their swellable counterparts and therefore originally contain less sites for chemical adsorption of free ions.

Shale factor is a measure of the cation capacity of clays. Cation exchange capacity will decrease as clays convert from smectite to illite. Therefore, geopressed zones generated by restricted diagenesis due to inefficient dewatering mechanism, will theoretically show an increase of the shale factor due to the increased porosity and hence larger surface areas of cation exchange. If illite and kaolinite were the primary clays, the shale factor would be low initially. In geopressed sections of such clays, the shale factor may show no increase whatsoever. Hence in sections of mature, reworked clays, shale factor may be of little use in the detection of geopressures.

Also, in geopressure zones caused by dehydration, i.e. water released to the pore spaces has been unable to escape fast enough and resulting in a pore pressure increase, the shale factor will decrease since the smectite has been converted to illite. Therefore shale factor may not be a useful geopressure indicator; this is also the case when geopressure was generated by tectonic forces and aquathermal pressuring other than compaction disequilibrium.

The method of shale factor determination used by Exlog at the wellsite is as follows:

1. dry samples in oven;
2. pulverise the sample to fine powder with mortar and pestle;
3. Sieve powdered sample through 80-mesh sieve;
4. weight 0.5 gm of the powder & add this to a solution of distilled water acidified with a few drops of 5N Sulphuric acid in the blender metal measuring cup;