

Basin.

Highest present day heat flows occur over mid-oceanic ridge crests and in rift valley grabens with up to 8 Heat Flow Units (HFU see equation (1) below) and average values of 4 HFU. This is 2 to 3 times the average heat flow of stable areas. It has been established that heat flow drops to < 3.0 HFU within 150km of the rift centre. This equates to a rapid drop in heat flow within 5 MMY following plate separation and to 1.28 HFU within 15-20 MMY. Most basins do not drop as low as 1.28 HFU, which is a characteristic of mid-oceanic basins. The average is higher at 1.9 HFU. It is emphasised that in areas of Tertiary volcanics, higher values of 2.2 HFU are common.

The geothermal gradient at any location is given by:

$$G = \Phi \xi \dots\dots\dots (1)$$

where Φ = heat flow (1 micro cal cm⁻² sec⁻¹)

= 1 Heat Flow unit

= HFU

ξ = thermal conductivity

G = Geothermal gradient °C/km

It should be noted that both coal and shale have relatively low thermal conductivity compared with sandstone. The thermal conductivity of volcanics and intrusives can range from poor to very poor. Porous but low permeability tuffs can act as thermal blankets. Overpressured sections also tend to act as areas of low thermal conductivity.