

GY360 Uplift Problem

Given the below information, calculate the average uplift rate of the terrane from which the information was collected over the time span indicated.

An amphibolite sample yielded the following age dates:

Hornblende K-Ar radiometric date: 350Ma (Blocking T = 500°C)

Biotite K-Ar radiometric date: 315Ma (Blocking T = 250°C)

The type of metamorphic terrane from which this sample was collected indicates a geothermal gradient of approximately 35°C per kilometer during the metamorphic event spanning 350-315Ma. Assume that the ground surface was 25°C throughout the time of uplift.

1. Calculate depth to sample @ 350Ma:

2. Calculate depth to sample @ 315Ma:

3. Calculate the average uplift rate in units of mm/year using (1) and (2) above: