

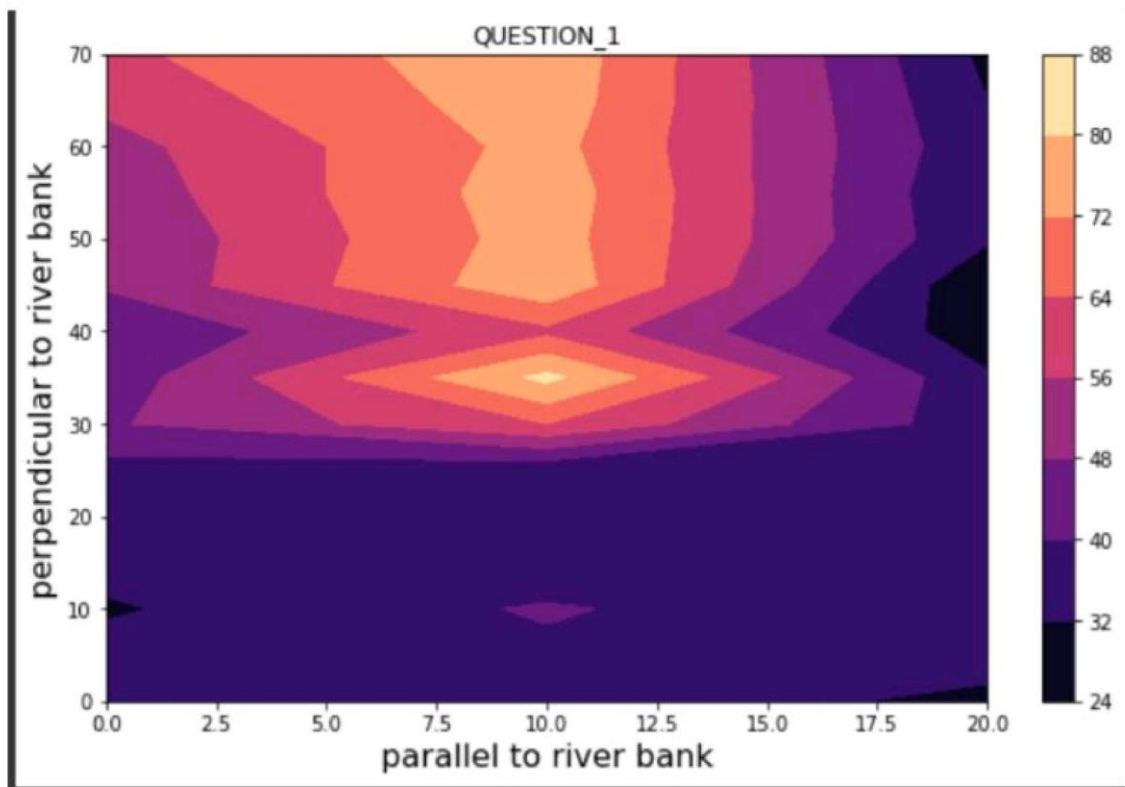
Field Work Assignment

Utkarsh Jaiswal

18EX20030

1. Given below is the radioactive dose rate data set along a beach area enriched with minerals. The data is expressed in $\mu\text{R/hr}$. The data covers the entire width of the beach. Along the shoreline the dose rate is measured at a gap of 10m, perpendicular to the shoreline the dose rate is measured at a gap of 5m. Create 2D Isorad Map from the given data and answer the following questions below:

Solution:



A) Describe briefly the salient aspects of the Isorad map.

An isorad map of the total radioactivity measurements at the surface of the studied area was plotted.

This data represented in the form of grid where in each grid is of 20 m X 5 m dimension. We generated an Isorad contour map from this data. One grid area was 100m² and the total area is 1500m². The total radioactivity count rates in the study area range from 4 - 30 μ R/hr.

B) Can you determine a zone of mineralisation from this map?

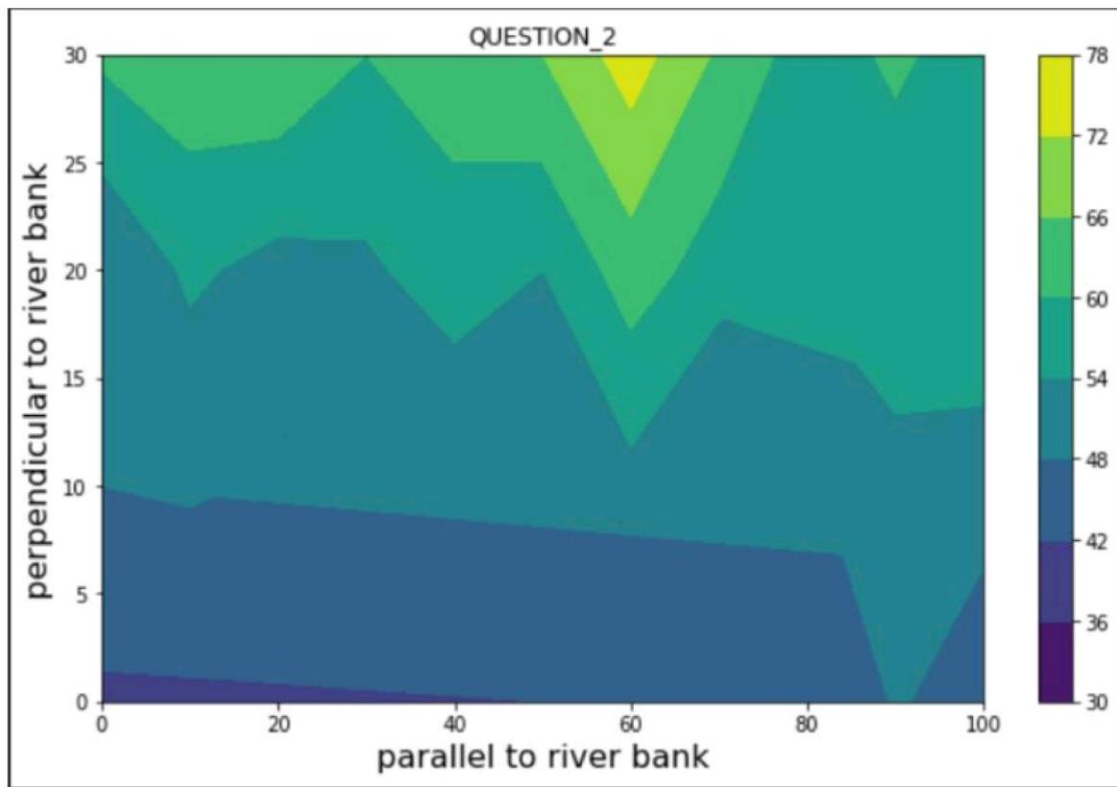
The humid climate that was prevalent during Jurassic time participated in activation of chemical weathering; dissolution and washing of overburden moved Uranium, Thorium, Potassium and Rubidium with alkalis downward producing an overburden depleted with radioelements, especially minor concentration of uranium and thorium, whereas the buried sediments filled and enriched with radioelements due to adsorption of those radionuclides (U and Th) by clay minerals and bauxite deposits. This mechanism led to accumulating the radioactive materials within clay beds, flint and bauxite at a depth of more than 5m which can't be detected by the portable gamma ray spectrometer.

C) If found, what type of mineral deposits does it represents?

These anomalies suggest that area might have undergone hydrothermal alteration due to which uranium might have been trapped in the clay. Hence high counts have been observed in this region.

2) Given below is the radioactive dose rate data set along a river bank enriched with minerals. The data is expressed in nGy/hr. The data covers the entire width of the river bank. Parallel to the river bank the dose rate is measured at a gap of 5m, perpendicular to the river bed the dose rate is measured at a gap of 10m. Create 2D Isorad Map from the given data and answer the following questions below:

Solution



A).Describe briefly the salient aspects of the Isorad map.

This data represented in the form of grid where in each grid is of 20m X 5 m dimension. We generated an Isorad contour map from this data. One grid area was 10m² and the total area is 1500 m². The total radioactivity count rates in the study area range from 31-45 nGy/hr. It was recorded as 25 to 35 cps in the central part of the study area while the background radiation was upto 50-110 nGy/hr in the surroundings.

B)

Can you determine a zone of mineralisation from this map?

In the contour plot, clearly two highly radioactive pinpoint zones can be seen. The least radioactive zone is also visible. Both the regions having high count rates are separated by some distance.

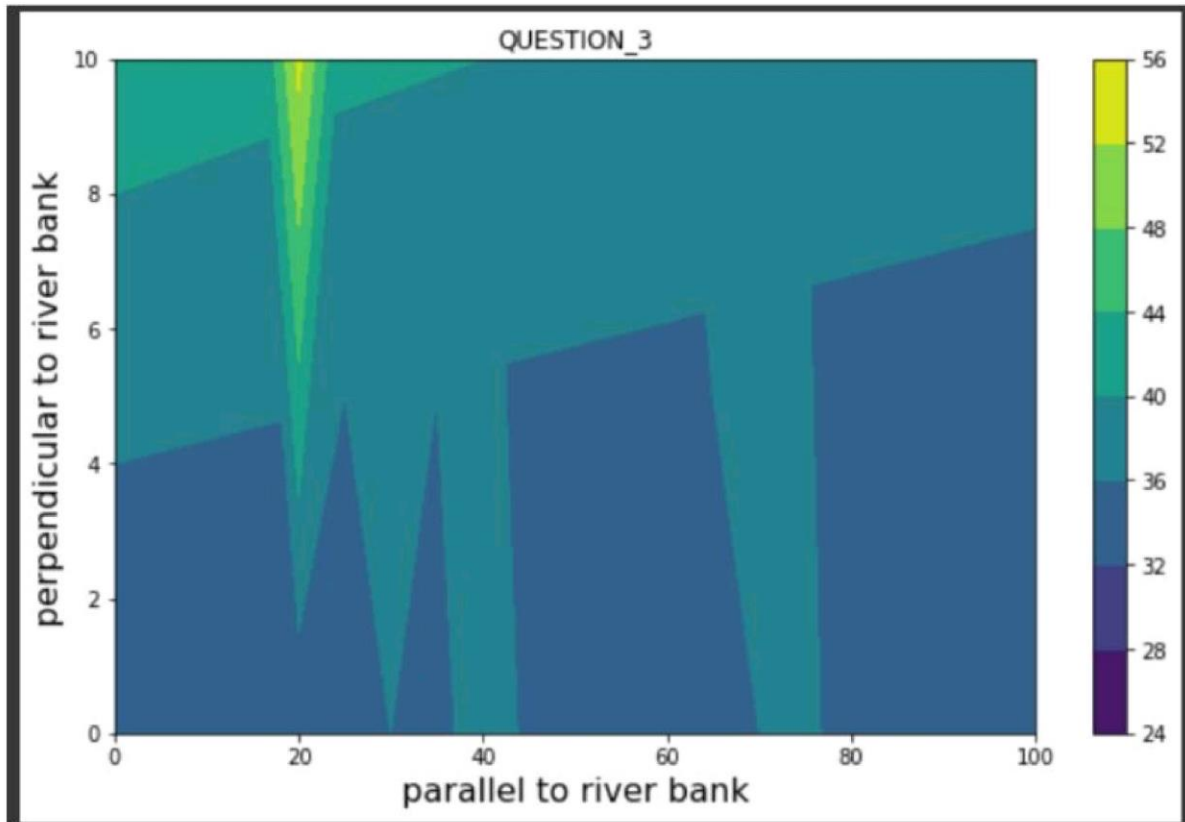
This could be due to the presence of more clay content in this region. Hence, high radiation counts have been observed.

3)

Given below is the radioactive dose rate data set along a river bank enriched with minerals. The data is expressed in nGy/hr. The data covers the entire width of the bank. Parallel to the river bank the dose rate is measured at a gap of 5m, perpendicular to the river bank the dose rate is

measured at a gap of 10m. Create 2D Isorad Map from the given data and answer the following questions below:

Solution



A)

Describe briefly the salient aspects of the Isorad map

This data represented in the form of grid where in each grid is of 20 m X 5 m dimension. We generated an Isorad contour map from this data. The total radioactivity count rates in the study area range from 27 to 151 nGy/hr. It was recorded as 45 to 55 cps in the central part of the study area while the background radiation was upto 90-100 nGy/hr in the surroundings. An isorad map of the total radioactivity measurements at the surface of the studied area was plotted.

B) Can you determine a zone of mineralisation from this map?

In the contour plot, clearly two highly radioactive pinpoint zones can be seen. The least radioactive zone is also visible. Both the regions having high count rates are separated by some distance.

This could be due to the presence of more clay content in this region. This suggests that the area might have undergone hydrothermal alteration, due to which Uranium might have been trapped in the clay.