Extensional tectonics in the field: Utah and Nevada

Intended audience

Geoscientists requiring an understanding of how three-dimensional extensional fault relationships, that are often inferred in subsurface models, maps and sections are recognised in the field. The course would be of particular relevance to geologists and geophysicists working in the field of petroleum exploration.

Course objectives

- To give participants the opportunity to 'see' three-dimensional extensional fault relationships in the field that are often inferred in maps, sections and three-dimensional models.
- To examine the three-dimensional form of extensional geometries, faulted geology, and the dynamics of faulting on a full range of scales from that of the fault zone to that of the basin.
- To examine and analyse three-dimensional structural modelling techniques commonly applied to the analysis of both two-dimensional and three-dimensional remotely-sensed subsurface data.
- To develop concepts and models of extension that are applicable on a variety of scales and to many geological terrains of the UK, particularly the Devono-Carboniferous basins of central and northern England and southern Scotland.
- To examine the effects of faulting and three-dimensional fault relationships on the syn-rift sedimentary fill of basins and the migration of economic fluids (hydrocarbons, mineralising fluids, water), and to develop three-dimensional models of the ways in which structure can aid or inhibit migration.

Course description

The course places a heavy emphasis on the three-dimensional aspects of faulting and fault interpretation. It will equip participants with a three-dimensional understanding of the principles and geometries involved, allowing them to make rigorous, three-dimensionally sound, geological interpretations in areas of limited data and from spatially limited, remotely sensed datasets such as seismic sections, satellite imagery and air photographs.

To this end, the course integrates examples of extensional structures visible in remotely sensed data, from the field area and elsewhere, and compares them with structures visible in the field. The course also makes extensive use of computer modelling to demonstrate and explain the three-dimensional application of structural modelling techniques examined in the field. Analysis of three-dimensional structural geometries and modelling techniques will be performed using three-dimensional computer models of both the field area and other extensional terrains, in order to demonstrate the applicability and limitations of the techniques and compare the results with field analysis.

This course is run jointly between the BGS and Dr Stu Clarke of Keele University. The course leaders are active researchers in the area and share supervision of a number of PhD and M.Geoscience research projects that are developing new structural insights and models into the region, putting this course at the leading edge of research here.

Course duration

10 days

Delivery mode

Field-based course

Course fee

Dependent on seasonal price fluctuations and exchange rates

It is expected that course attendees make their own travel arrangements to and from Salt Lake City, Utah

Date(s)

Early Autumn

Location

Utah, USA