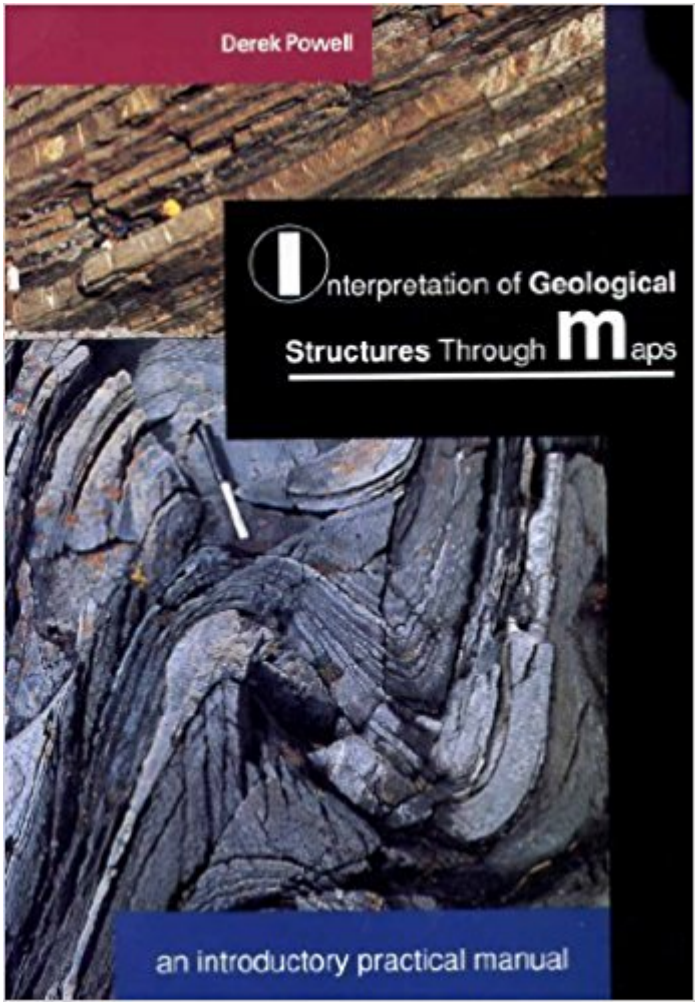
Interpretation Of Geological Structures Through Maps: An Introductory Practical Manual



Synopsis

In the same way that topographic, road, and rail maps provide us with information concerning the nature of the land surface and the location of man-made features. Geological maps contain data which allows an understanding of the distribution of rocks that make up the crust of the Earth and the orientation of structures they contain. Unlike ordinary maps however, geological maps include information which allows us to assess not only the location of particular rocks and the areas they cover, but also their underground extent and their geological history. Geologists construct geological maps by making observations of the nature of rocks exposed at the surface of the Earth, in drill-holes and mine shafts, and recording these on topographic maps and/or aerial photographs. In doing this they plot the locations of contacts between different rock types and measure the attitudes of these and other planar and linear features within rocks. From such information geologists can predict the shapes of rock formations at depth. Formations which, in some instances, may contain gold, oil or gas etc. Although geological maps are two dimensional, knowledge of how to interpret them permits an understanding of the extent of the geological features they show,in three dimensions, ie., both below ground and, before they were eroded away, above ground level. The ability to successfully employ geological maps in this way, depends not only on interpretation of direct measurements of the attitudes of planar and linear geological features, but also on an understanding of the relationships between the shapes of bodies of rocks, as seen on maps, and the shape of the ground surface (ie., the topography). Map interpretation is vital to all who wish to fully understand geological processes, but it confronts many students and practitioners of Geology with difficulties. This is because it is necessary to gain a three dimensional picture in the mind and eventually on paper, from data that is presented in two dimensions, ie., as a geological map; a task that is not often met in other subjects. For a few, this ability is gained quickly but, for most of us, it takes longer and is very much a matter of practice making perfect. Consequently this manual attempts to give an appreciation of the basic problems and techniques involved in unravelling the geological structure of an area from data presented as a map. Further, by pursuing some problems of analysis through use of structure contours, it attempts to encourage the reader to develop the ability to manipulate three-dimensional data.

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