STRUCTURAL DIVISION TALK

Outcrops Don't Lie: A Structural Geology Double Feature

SPEAKER
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Time: 12:00 pm
Date: Thursday, February 7, 2019
Location: Schlumberger Palliser One Building
200, 125 - 9th Ave SE, Calgary

Figure 1: Looking north along the Trans-Canada Highway towards Field, B.C., with the investigated outcrop on the right.

ABSTRACT: PART 1
The structural inventory and multiple deformation of a single outcrop along Highway One near Field, B.C. is described. It is located in the Western Ranges of the Rockies and hosts sediments of the Cambrian Chancellor formation. Crosscutting veins and two cleavages act as strain markers. The deformation observed is compared to other areas inside and outside the Rockies and these observations are used in support of a realistic model for the Rockies as a whole and for the general interpretation of fold-thrust relationships. It is concluded that the observed structural style be applied to subsurface interpretations where data is generally less detailed and therefore more ambiguous compared to the surface.

Figure 2: Looking South West on Moose Mountain

ABSTRACT: PART 2
Looking south from the fire lookout on Moose Mountain, the Turner Valley formation shows a structural style that varies very considerably over a strike direction of 1000 meters. In the foreground, (A) the rocks are deformed by a detachment fold. 1000 meters further along strike, to the south (B), the same structure has transitioned into a fault bend fold style of deformation. The fault throw is much larger here with a sense of movement on it in the order of eight hundred meters. This fault still carries the Turner Valley formation in the hanging wall, but now it appears that the bed dips are close to parallel with the fault. This is the same in the footwall of the fault, where the younger Mount Head formation also has the bed dips parallel with fault.

The rapid variation in structural style along strike is not common on a regional scale but it is locally common in many of the large gas fields in this area. This abrupt change in the structural style along strike will have a profound impact on the success and failure of horizontal wells that are being drilled in the strike direction in the fold and thrust belt of the Canadian Rocky Mountains in Alberta.

BIOGRAPHIES

Jürgen Kraus is a consulting structural geologist and international exploration geologist with his own company, Franconia Geoscience Ltd. He is also a director of the Canadian Global Exploration Forum (CGEF) and co-chair of CSPG's International Division, a fellow of the Geological Society of Canada (GAC) and a member of the AAPG and GSA. He has been on the Executive of the Canadian Tectonics Group (CTG) since 2003.

Apart from the Foothills, Jürgen's hands on experience in fold-and-thrust belts goes back to the 1980s (Rhenish massif as the central European extension of the Appalachians), his M.Sc. mapping in the Moine Thrust Belt in the Scottish Caledonides, gold exploration in the Ecuadorian Andes, and oil & gas exploration in the Tibetan foothills of the Sichuan Province of China.

Jürgen held his first petroleum-related position in 1987. He received an M.Sc. in Structural Geology and Geophysics from Göttingen University in 1991 and a Ph.D. in Structural Geology from the University of New Brunswick in 1998.

After assignments with the Geological Survey of Canada, Aachen Technical University, and the Saskatchewan Geological Survey, he joined Shell Canada

in 2001 and created drillable prospects in the Foothills at Waterton and Pincher Creek. Jürgen established his consultancy in 2003 and has worked on international oil and gas projects for various companies since.

Andrew Newson has over 35 years of experience in the geological and geophysical evaluations of overthrust belts. He is a Professional Geological Consultant registered in the province of Alberta. Andrew graduated with a B.Sc. (Hon) in geology from London University, England. Since then he has worked as a structural geologist specializing in the exploration and exploitation of hydrocarbon prospects in overthrust belts around the world.

Andrew has had numerous successes. These include discoveries in the overthrust belts of the Taranaki basin of New Zealand in 1983 (McKee/ToeToe structure), the Alberta Foothills in 1993 (Moose Mountain) and the BC Foothills in 1991 and 1999 (Sikanni/Pocketknife).

As a consultant since 1991, Andrew has been involved with numerous projects for clients among the major, independent and junior oil and gas companies. Through Moose Oils Ltd he teaches in-house workshops on fold and thrust play evaluation techniques and regularly leads field trips for industry. He is closely involved in developing balanced cross section and dipmeter analysis software packages to assist in the structural interpretation of thrust and fold plays.