Ceramah Teknik (Technical Talk)

Significance and Recognition of Mass-Transport Deposits in Deepwater Environments

2 April 2007
Geology Department
University of Malaya
(in collaboration with the Dept of Geology, University of Malaya)

Dr Craig Shipp

About 50 members of the Society, members of the AAPG Student Chapter in University of Malaya and some others from the oil industry attended the talk on "Significance and recognition of Mass-Transport Deposits in Deepwater Environments (abstract below)". The talk was presented at the Geology Lecture Hall, University of Malay at 5.30 pm on Monday, 2 April 2007.

Dr. Shipp also gave a lecture on "Where Offshore Drilling Meets Shallow Geology: Impact of Near-surface Depositional Systems on Deepwater Operations" to KLEX members at the Kuala Lumpur Convention Centre the next day.

Report by C.P.Lee

Abstract

Analysis of the seafloor and subsurface interval on large 3D seismic surveys from global deepwater basins globally reveals a myriad of geomorphic details over a wide range of geologic settings. A consistent seismic signature present in nearly every survey is the preponderance of features related to mass failure. These features, collectively termed mass-transport deposits (MTDs), are defined as any feature (and occasionally entire stratigraphic intervals) resedimented since time of original deposition. In large part, due to confusing terminology, MTDs include what commonly are called submarine slides, slumps, mass flows, debris flows, mass movements, debrites, mass transport complexes, as well as a host of other informal terms. Realization of the importance of MTDs as a major component in deepwater systems developed slowly for two reasons. First, ill-defined recognition criteria can hamper definitive identification. This always will be a lingering issue due to the highly variable dimensions of MTDs. Second, until recently there has been a perceived lack of economic significance, and in part this has contributed to the paucity of studies concerning these features. This is particularly true for buried MTDs, rather than the more easily imaged features on the seafloor. Clearly, MTDs are an important element of deepwater environments. It is now evident that MTDs can form a large percentage of the stratigraphic volume on the continental slope in many deepwater basins. Besides their association with hydrocarbon accumulations as seals and occasionally reservoirs, MTDs can be geohazards that affect deepwater drilling operations and field developments.

As surficial MTDs have received increased attention in the past few years, the size and extent of these features now are known (e.g., the Storegga slide in the Norwegian Sea). What is less understood and more difficult to image is the geometry and extent of MTDs in the subsurface interval. It has only been in the last decade that 3D seismic data are of sufficient resolution to resolve the internal structure of these features. Even then, the improved resolution is confined to near-surface interval, where higher seismic frequencies are preserved. As a first overall criterion, identification of MTDs depends largely on recognition of the characteristic low-amplitude, chaotic seismic character. A second criterion is the highly variable dimensions of features, in both the strike and dip extent, which can vary more than three orders of magnitude (i.e., 0.1 to 100 km). The thickness of MTDs can be within a few meters of seismic resolution, to greater than 500 m. A third criterion relates to distinct, identifiable internal character. Often, the updip limit is marked by a prominent headscarp with rotated, intact blocks, located immediately downdip. On occasion, the terminus of may consist of distinct, compressional imbricate toe thrusts. A fourth criterion relies on predictable plan-view geometry of these features. Frequently, the updip headscarp is concave downs-lope, while the downdip terminus, when observed, is convex downslope. However, this criterion may be least reliable to observe due to data display capabilities and influence of antecedent topography.

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Dr Craig Shipp, Distinguished lecturer from AAPG giving a talk at GSM

Tea break before the talk commenced

Dr Craig Shipp stressing a point in his talk

Part of the audience at the talk by Dr Shipp

Part of the participants at the talk

GSM President Dr Lee CP presenting a token of appreciation to Dr Craig Shipp