Geophysical Research Abstracts
Vol. 14, EGU2012-4689, 2012
EGU General Assembly 2012

Selected highlights of a half-century of academic and industry studies of turbidite systems

C. H. Nelson
(hansnelsonugr@hotmail.com)

From more than 50 years of research on modern turbidite systems and considering this bias (e.g. experimental and modeling research not included in this summary), the following are my suggested landmarks for interplay between academic and industry research on turbidite systems:
1.In the 1960′s, the outcrop research of the Bouma sequence showed immediate relevance for the characterization of proximal to distal depositional environments of modern Astoria Fan (e.g. a&b structures in proximal channels, c-e in levees, a-e in lobes, d&e in basin plains), and for identification of turbidites in industry boreholes.
2.In the 1970′s, Mutti and Ricchi Lucchi′s facies assemblages from outcrops correlated well with Nelson and Nilsen′s comparison of modern and ancient turbidite systems. The emerging models from this and other outcrop and modern system studies of Walker and Normark provided early guidelines for industry exploration.
3.In the 1980′s, the new high-resolution sidescan sonar studies on modern systems revealed the complex morphology of channel and lobe systems. These new details interplayed with the major contribution of seismic sequence stratigraphy from industry, which had important implications for outcrop studies, modern system research, and an emerging variety of improved fan models that considered the depositional elements defined by Mutti and Normark. The maturity of studies at this point outlined the key tectonic, sediment supply and climate/sea level factors controlling the development of a wide variety of turbidite system depositional patterns.
4.In the 1990′s, the 3D seismic studies of industry and high-resolution seismic and coring studies on modern systems provided detailed new insight into a complex variety of turbidite systems, particularly for slope environments. The close comparison of these data confirmed the relevance of present-day turbidite systems as a key to past outcrop and subsurface systems.
5.In the new millennium, seismic geomorphology and detailed outcrop studies have improved on prior modern/ancient source to sink comparisons, as well as provided new insights into the complex interplay of MTD and turbidite deposits. Borehole, DSDP/ODP/IODP drilling and piston coring previously, and particularly in this decade, have a) outlined differences in turbidite system stratigraphy between active tectonic and passive continental margins, b) confirmed lithologies for seismic facies of turbidite system depositional elements and c) identified new varieties of turbidite lithologies such as linked debrites and seismo-turbidites. The future suggests increasing integration of detailed academic and industry studies to better define petroleum reservoir architectures, controls and complex MTD and turbidite lithologies.

This talk is dedicated to the memories of my friends and colleagues, Arnold Bouma, Tor Nilsen, Bill Normark and Bruno Savoye, who made significant contributions to turbidite research and to integration of academic and industry studies.