



Greg Gordon

Greg received a B.S. in Geosciences from the University of Texas at Dallas, and an M.S. in Geology from California State University (Bakersfield). His M.S. thesis was entitled “Stratigraphic and sedimentologic controls on reservoir quality and distribution: Middle Wildcat Group, Grizzly Bluff gas field, Humboldt County, California.” After working for six years as a petrophysicist and development geologist for Occidental of Elk Hills, Inc., and Foothills Resources (a small

independent oil and gas company) in California, Greg headed back to school to pursue a Ph.D. in Geology. As a research assistant in the Chevron Center of Research Excellence at the Colorado School of Mines, he is currently studying turbidite systems in structurally confined basins in Spain and California.

My Ph.D. research involves studying turbidite systems in small, structurally confined basins. Particular emphasis will be placed upon the margins of these systems and reservoir quality issues therein. I seek to understand the sedimentology and stratigraphic architecture of these systems – and how they respond to syn-depositional structural features such as anticlines and fault scarps. This research will be directly applicable to the petroleum industry (deep-water plays), where wells are currently being drilled into turbidite reservoirs in small slope basins. Many of these confined basins formed due to a mobile substrate (shale, or salt-withdrawal), but it is my hope to use detailed outcrop data from other tectonic settings as an analog for current deep-water basins and their reservoirs.

A large portion of my Ph.D. research will be field-based. I will conduct field work in two specific field areas: the Ainsa basin (southern Pyrenees, Spain), and the East Ventura basin (California). To fully document the turbidite systems in each of these areas, I will complete detailed field maps (sand-body maps), numerous measured sections, paleogeographic maps, and mineralogic/compositional analysis. Please find a further summary below.

Purpose:

The purpose of my research is to enhance sedimentologic/stratigraphic knowledge of strata located along the margins of structurally confined submarine fans, with particular emphasis on reservoir quality.

Regional Context:

I will be focusing on two systems: (1) the Guaso turbidite system (Ainsa basin, Spanish Pyrenees); and (2) the Modelo-Towsley Formations (East Ventura basin of southern California). The Ainsa basin is a piggy-back basin in a fold-and-thrust-belt setting, whereas the East Ventura basin is a Miocene transtensional basin that experienced inversion in the late Pliocene. Both of these basins are relatively small in area (~ 100 km²), and might serve as excellent analogs to high-subsidence-rate northern Gulf of Mexico salt-withdrawal mini-basins.

Methods:

This is a field-based study. Field work will include: mapping (sandstone bodies, unconformities, and condensed sections), taking paleo-current measurements, and measuring several stratigraphic columns. Scanning-electron microscopy (SEM), thin-section, and X-ray diffraction analyses of turbidite sandstones will aid in my full description of these rocks: their sedimentologic evolution and reservoir properties. Work products of the study will include correlated stratigraphic cross-sections, facies charts, net-sand thickness maps, facies maps, SEM images displaying pore-throat geometries, and paleogeography maps.

Scientific Importance:

The relationship between turbulent flow dynamics and the properties of the resulting deposits (e.g., mineralogic, reservoir quality, architectural properties) has important implications for the sub-disciplines of sedimentary and stratigraphic geology, as well as applied geoscience (petroleum geology). By understanding how fan-fringe turbidite systems evolve (i.e., how they are deposited through time) in structurally confined settings, we can enhance our knowledge of where to drill along the margins of turtle structures and deep-water mini-basins. This study will contribute to sedimentology and basin analysis, and could help provide the scientific underpinning for increased oil recovery in a deep-water setting.