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# Hydrocarbon Prospectivity of Rifted, Conjugate Margins of the Gulf of Mexico, Central Atlantic, and South Atlantic

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## ABSTRACT

The concept of upper and lower plate margins formed on opposite sides of a low-angle detachment during the early rift phase was proposed over three decades ago by Lister, Wernicke, and others—yet this conceptual model remains controversial to the point that the upper and lower plate terminology seldom appears in recent papers on conjugate margins. In this talk, I will show that many conjugate margins can be classified into the upper and lower plate types using the basic, crustal elements and geometries outlined by the early asymmetrical rifting proponents that are summarized in the diagram below from Davison. Less extended, upper plates in cross section have narrow and steep crustal profiles while the more extended lower plates produce more tapered profiles with lower-relief belts of rifts whose sag phase can localize giant salt basins. Examples of these two, strikingly, different margin profiles was noted by Marton and Buffler in the 1990s for the less extended Yucatan Gulf of Mexico margin (upper plate) and the more extended U.S. Gulf of Mexico with an extensive salt basin (lower plate). Similarly in the 1990s, Davison noted the alternation of the two margin types along the Brazilian margin. Within the framework of these concepts of upper and lower plates, I compare the wealth of geophysical data especially from seismic reflection and refraction studies that can be used to characterize upper and lower plates—along with symmetrical or neutral conjugates - in a much more systematic manner than possible by the early proponents of the upper and lower plate concept in the 1980s and 90s. These same geophysical data sets can also be used to compile the locations of volcanic margins that form late in the rifting process and are characterized by voluminous, volcanic flows expressed as “seaward-dipping reflectors.” The regional map of the locations of proposed upper and lower plates—along with volcanic margins—is then overlain on a map of present hydrocarbon production to identify the most promising areas for future exploration.