

## SEISMIC INVESTIGATION OF TWO COASTAL SABKHAS, EASTERN SAUDI ARABIA

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(Received March 24, 2009; revised version accepted June 17, 2009)

### ABSTRACT

Al-Shuhail, A.A. and Al-Shaibani, A.M., 2009. Seismic investigation of two coastal sabkhas, eastern Saudi Arabia. *Journal of Seismic Exploration*, 18: 329-345.

Sabkhas are common topographic features in eastern Saudi Arabia. Characterization of sabkha stratigraphy and structure is of both geological and economic significance due to their importance for oil exploration, as well as their influence on urban development. In this study, we use seismic refraction methods to determine velocities and thicknesses of the uppermost layers in two coastal sabkhas in eastern Saudi Arabia, namely the Al-Aziziyah and Ar-Riyas sabkhas.

Our data were acquired using a standard reversed-refraction profile with five shots distributed across the profile and 24 vertical 14-Hz receivers spaced at 5 m. Data processing included amplitude gain, band-pass filtering, and manual picking of first arrivals. Interpretation of the data from Al-Aziziyah sabkha shows three main layers: a dry sandy layer having an average velocity of 300 m/s with a variable thickness between 0.1 and 1.0 m, a wet sandy layer having an average velocity of 1775 m/s with a relatively uniform thickness of 60 m, and bedrock with an average velocity of 2850 m/s. Data from Ar-Riyas sabkha also shows three main layers: a dry sand-mud layer having an average velocity of 300 m/s with a variable thickness between 0.2 and 0.9 m, a wet sand-mud layer having an average velocity of 2150 m/s with a relatively uniform thickness of 60 m, and bedrock with an average velocity of 3550 m/s.

Although the two studied sabkhas are about 80 km apart and are of different ages, they have relatively similar stratigraphic columns, seismic velocities, and thicknesses, suggesting a similar geological origin and history. Knowledge of this stratigraphic similarity is helpful in planning seismic surveys in sabkhas, but more study is needed before results from this study should be generalized and applied to other sabkhas elsewhere in the world.

**KEYWORDS:** coastal sabkhas, seismic refraction, eastern Saudi Arabia, Al-Aziziyah sabkha, Ar-Riyas sabkha.