



Assessment of gas hydrate from P-wave velocity modelling in the Krishna Godavari basin, eastern margin of India

Anju K Joshi (1), Kalachand Sain (2), and Laxmi Pandey (3)

(1) CSIR-National Geophysical Research Institute, Gas Hydrate (Marine Seismics), Hyderabad, India (anju841991@gmail.com), (2) CSIR-National Geophysical Research Institute, Gas Hydrate (Marine Seismics), Hyderabad, India (kalachandsain@yahoo.com), Academy of Scientific and Innovative Research (AcSIR)-NGRI, Hyderabad, India (kalachandsain@yahoo.com), (3) CSIR-National Geophysical Research Institute, Gas Hydrate (Marine Seismics), Hyderabad, India (laxmigeophybh@gmail.com), Academy of Scientific and Innovative Research (AcSIR)-NGRI, Hyderabad, India (laxmigeophybh@gmail.com)

The sonic logs at sites of NGHP-02-17 and NGHP-02-19 are analysed to determine the accurate saturation of gas hydrate using both isotropic and anisotropic modelling. The insitu properties of the gas hydrate reservoir vary with the anisotropic effect, and the inclusion of anisotropic characteristics reveals the actual condition of the reservoir. The study is intended to investigate whether the isotropic or anisotropic assumption of gas hydrate bearing sediments can best describe the saturation of gas hydrate at respective sites. The anisotropic effect due to the presence of fractures with varying dip angle is considered, and the transverse isotropic theory for laminated media is used for anisotropic velocity modelling. The simplified three-phase Biot equation is used for the isotropic velocity modelling. The ambient lithology at the sites changes the relationship between gas hydrate saturation and P-wave velocities with isotropic and anisotropic assumptions, and this helps in characterizing the gas hydrate reservoir. The study shows that the site NGHP-02-17 can be best characterised by the isotropic assumption, whereas the site NGHP-02-19 shows a mixture of isotropic and anisotropic behaviour. The base of gas hydrate bearing sediments is obtained as 288 mbsf at site NGHP-02-17 and 370 mbsf at site NGHP-02-19 respectively. An average saturation of 45.8% between 269-285.5 mbsf at Site NGHP-02-17 and of 33.8% between 306-312 mbsf in NGHP-02-19 are obtained from the present modelling.