

SLUG DETECTION IN WELL-PIPELINE-RISER SYSTEMS THROUGH FREQUENCY MONITORING

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Summary. A lot of effort is dedicated to monitoring the flow properties in offshore pipelines through measurements at the riser section above sea level, where equipment installation and maintenance are cheaper and easier. However, the multi-phase flow in the pipelines is hard to monitor due to the rapid fluctuation in gas volume fraction (GVF) and varying water cut. This paper presents a new, simple approach that offers flow monitoring through the frequency content in vibration measurements captured by installed accelerometers. Particularly, the methodological premise is to extract flow-induced vibrations from the total vibration response, which, besides the flow, is induced by external excitation from wind, waves and current. The distinguishment between the vibration sources is conducted by use of continuous wavelet transformation (CWT), which provides information about the frequency shifts and at what time instances they occur. When monitoring the multi-phase flow, the structural information gained from the CWT is then coupled to the flow properties through well-established analytical laws and numerical models.