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A limited region electrical capacitance tomography for detection of wax deposits and scales in pipelines

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ABSTRACT

Pipelines are very critical infrastructures allowing flow of many essential components in modern lives. The deposit of scales and waxes can create problem in many industrial flow. Examples are in scale formation on crude oil pipelines. For Crude oil pipelines a chemical removal method is used for cleaning of the deposits in aboveground pipelines and a pigging method is used for underground and subsea pipelines. Deposit of scales is a major source of malfunctioning of the pipeline and the downtime of cleaning process can be very costly. In this paper we present a high resolution limited region [1] electrical capacitance tomography (ECT) for reconstruction of deposit in interior of plastic pipes [2, 3]. ECT provides an early detection of level of scaling and deposits in pipeline using a non-invasive capacitive measurements. In our proposed method a simple limited region tomography algorithm is developed enhancing the ECT imaging resolution allowing for detection of low level depositions. The experimental results are shown in figure 1. Further laboratory experimental data will be used to evaluate smallest level of deposit that can be detected.

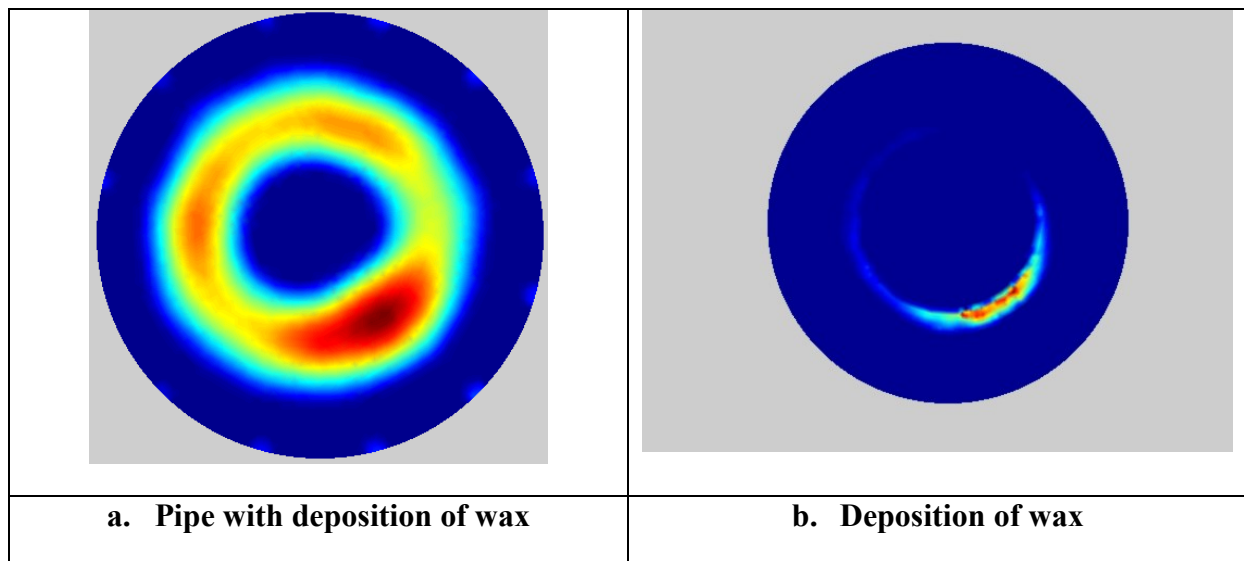


Figure 1: pipeline wax deposition inspection with 12 electrodes ECT data

Keywords: ECT, pipeline deposit monitoring, limited region tomography

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