Increasing the reservoir detectability in CSEM data with interferometry by multidimensional deconvolution

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Controlled-Source Electromagnetics (CSEM) is used in combination with seismics for oil- and gas-exploration. In a marine situation, an electric source, towed by a boat, emits a monochromatic signal, which is recorded by multicomponent receiver stations at the ocean bottom. Unfortunately, the signal does not only travel via the subsurface to the receivers, but also directly and via the air-water interface. The latter two travelpaths do not contain any information about the subsurface. In contrary, they cover a possible response from a subsurface reservoir. Therefore, one aims to suppress the signal travelling along those paths. Interferometry by MDD replaces the overburden by a homogeneous halfspace suppressing any interactions with the air-water interface. Furthermore, the direct field is removed. Since interferometry by MDD is a data-driven method, no information about the ocean or the subsurface is needed, except the material parameters at the receiver level. We give an overview of interferometry by MDD by presenting the processing flow and discussing limitations of the method and show that the reservoir detectability is significantly increased after interferometry by MDD has been applied to CSEM data.