Supporting Information for

Marine Dipole-Dipole Controlled Source Electromagnetic and Coincident-Loop Transient Electromagnetic Experiments to Detect Seafloor Massive Sulphides: Effects of Three-Dimensional Bathymetry

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Content

Introduction

The supporting information includes figures that support the modelling and inversion studies presented in the manuscript. The first section contains a comparison between 2.5D and 3D data calculated for the corresponding models displayed in Fig. 4 of the manuscript. The second section deals with navigational uncertainties in measured CSEM data that are addressed with a relative error floor.

A1. 2.5D vs 3D Forward Modelling

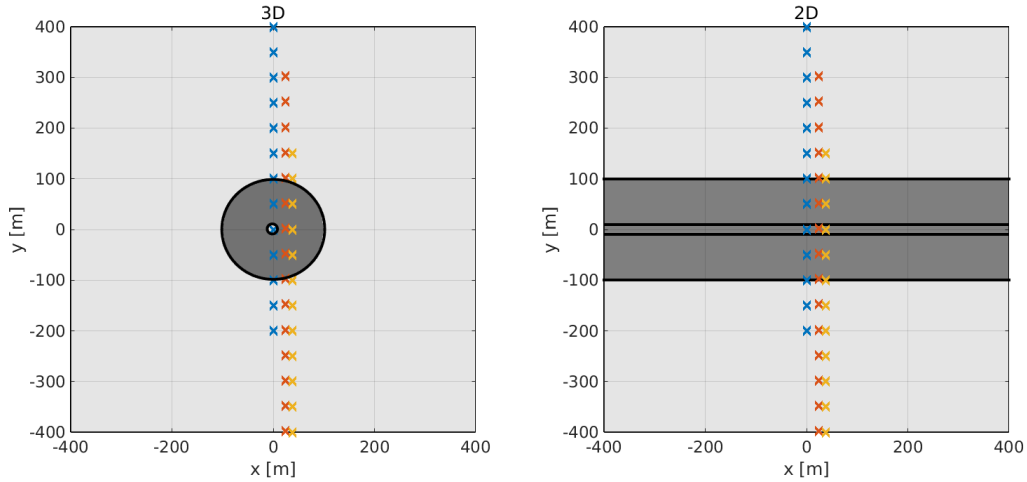

Figure A1: Plan view of a (left) 3D conductivity model compared to a (right) 2D resistivity model. For 2.5D forward modelling and 2D inversion, the conductivity in x-direction is assumed constant and does not vary.

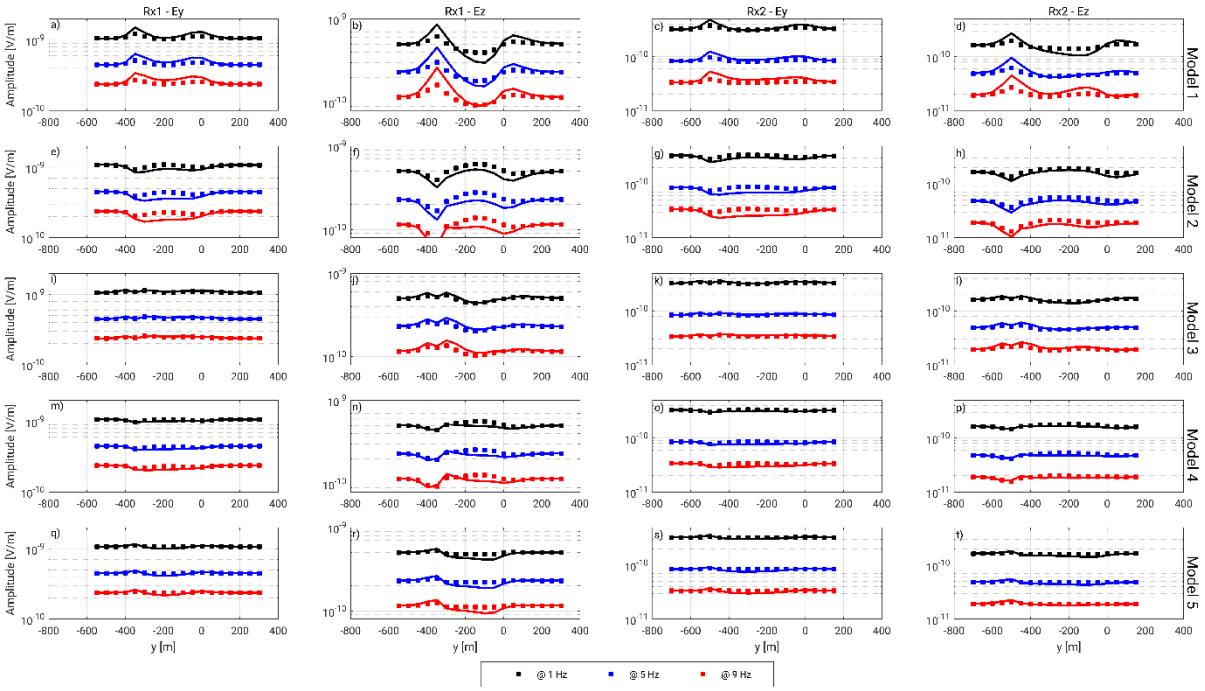

Figure A2: Comparison of (markers) 3D and (lines) 2D CSEM data for Vulcan 1 & 2 at offsets of 350 m and 505 m from the dipole centre, respectively. Sub-figures are sorted according to the desired field component (left to right) and corresponding models (top to bottom). The black, blue and red colours in each image denote the frequencies 1, 5 and 9 Hz respectively. Note that for inversion, 3 and 7 Hz are also included but not illustrated here.

A2. Navigational Errors and corresponding relative Errors

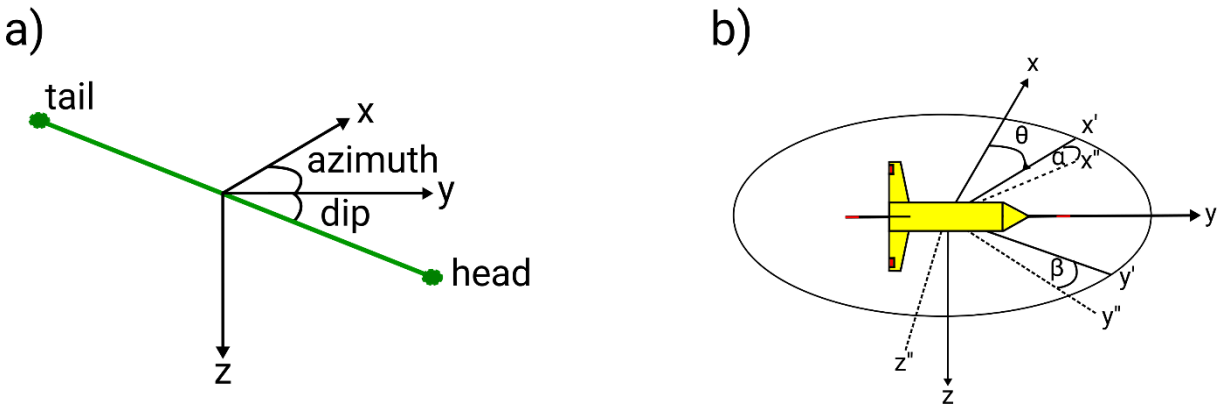

Figure A3: (a) HED transmitter dipole geometry for a typical CSEM experiment. (b) Vulcan receiver geometry and tilt angles. Images are modified after images from the MARE2DEM website and ***Key & Lockwood, 2010****.*

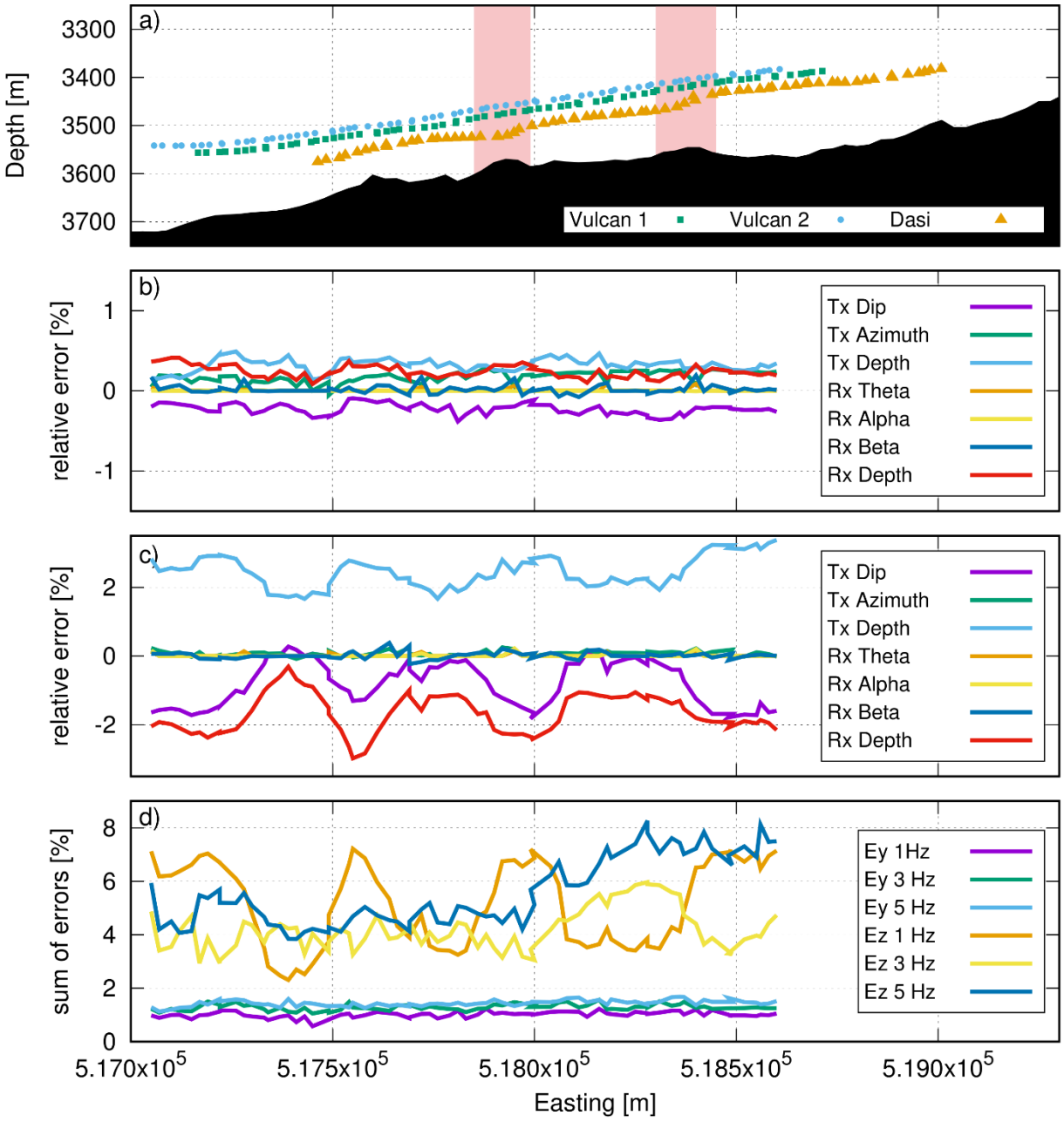

Figure A4: Relative data errors for Vulcan 2 receiver located at an offset of 505 m from the dipole centre. Each navigational parameter is perturbed by 0.5° or 1 m. The synthetic response of each perturbation is compared to the original parameter to derive a navigational error. For this study, we use the projected 2D bathymetry along the profile and assume the sub-seafloor to be homogeneous at 1 S/m. (a) Illustration of measurement geometry, (b) navigational errors of Ey, (c) navigational errors of Ez and (d) sum of navigational errors of Ey and Ez at selected frequencies.