

Seismic reflection profile dataset in a 3D environment of the Northern Adriatic area (Italy)

(<http://doi.org/10.5880/fidgeo.2020.027>)

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2. Citation

When using the data please cite it like:

Maffucci, R.; Petracchini, L.; Livani, M.; Billi, A.; Carminati, E.; Cuffaro, M.; Petricca, P.; Doglioni, C. (2020): Seismic reflection profile dataset in a 3D environment of the Northern Adriatic area (Italy). GFZ Data Services. <http://doi.org/10.5880/fidgeo.2020.027>

The data are supplementary material to:

Pezzo, G., Petracchini, L., Devoti, R., Maffucci, R., Anderlini, L., Antoncecchi, I., Billi, A., Carminati, E., Ciccone, F., Cuffaro, M., Livani, M., Palano, M., Petricca, P., Pietrantonio, G., Riguzzi, F., Rossi, G., Sparacino, F. and Doglioni C. (2020) Active fold-thrust belt to foreland transition in northern Adria, Italy, tracked by seismic reflection profiles and GPS geodetic offshore data. *Tectonics*, <https://doi.org/10.1029/2020TC006425>

3. Data Description

This dataset contains subsurface geophysical data from the Northern Adriatic area (Italy) organized in a 3D environment. In particular, it includes 60 (2-D) multichannel seismic reflection profiles made public by the Italian Ministry of the Economic Development in the framework of the ViDEPI project (Visibility of petroleum exploration data in Italy), georeferenced and organized into the Move[®] software (Midland Valley) environment. The full description of the data and methods is provided in the data description file. This collection represents the basis of a paper (Pezzo et al., in submission) devoted to the characterization of potentially active thrusts in the Northern Adriatic area, through the integration of seismic reflection profiles, offshore cGPS data from hydrocarbon platforms, and numerical modeling.

The ViDEPI project is a public database of technical documentation concerning Italian oil exploration. The documentation concerns expired mining permits and concessions dating since 1957 until today, and includes, in particular, well logs and numerous seismic profiles (available as PDF files) acquired in the different Italian commercial “Zones”. The documentation and material of the ViDEPI project is

freely available online at <http://www.videpi.com>. A list of seismic lines used for this study is provided in the [2020-027_Maffucci-et-al_move-data-sources.txt](#).

Seismic reflection profiles reported in the present dataset comes mainly from the “A” Italian commercial zone (northern Adriatic area) which extends between the city of Venezia to the north and the city of Pesaro to the south. The dataset consists of a regular network of inlines and crosslines, generally between 4 – 5 seconds (twf) deep, acquired by the Italian AGIP Oil Company (Azienda Generale Italiana Petroli) and processed by Western Geophysical Co.

3.1 Method

In order to reconstruct the structural setting of the Northern Adriatic area, we organized our seismic profiles dataset in a 3D georeferenced environment by using the Move® software. The interpretation of the seismic profiles was constrained by borehole data, consulted from the ViDEPI project (<http://www.videpi.com>), and by geological profiles and seismic profiles, already interpreted, available from literature (Bally et al., 1986; Argnani, 1998; Franciosi and Vignolo, 2002; Casero et al., 2004; Finetti and Del Ben, 2005; Fantoni and Franciosi, 2009; Kastelic et al., 2013; Wrigley et al., 2015; Amadori et al., 2019).

Move® provides a platform for integrating and interpreting data of different type (well logs, geological cross-sections and seismic lines) in a 3D environment, allowing the user to visualize the dataset in different frameworks of visualization (3D, map, or section views). Furthermore, it enables geoscientists to create structural models providing tools for depth conversion, structural restoration, validation and analysis.

We downloaded seismic reflection profiles from the ViDEPI database as PDF documents and converted them into JPG format images to import them into the Move® project. To do so: i) we georeferenced in a GIS database (QGIS software, version 2.18.20), the survey base maps archived in the ViDEPI project; ii) we digitized the tracks of the seismic profiles from the survey base maps in a shapefile containing features with polylines geometry; iii) we imported the polylines into Move® as separate polyline objects associating to them the seismic profiles as vertical images, scaling and moving the images in order to match the numbers of the shot points indicated on the seismic profiles with those reported on the survey maps.

4. File description

The presented dataset is stored in a Move® project and it is available in a .mve file format (Coordinate system: WGS 1984 / UTM zone 33N). The .mve project is organized in a list of 60 seismic reflection 2D-sections expressed as horizontal distance versus two-way travel time (time sections). Some seismic 2D-sections are constituted by more images representing different shot-point intervals.

Further details about the stored project can be found in a data table file ([2020-027_Maffucci-et-al_move-data-content.txt](#)), where the first column indicates the seismic profile identifier; the second column refers to the number of images that form the stored reflection profile; the third column reports the link to the ViDEPI database where it is possible to download the original seismic profile in a PDF format; the other columns indicates the latitude and longitude (decimal degrees - WGS84) of

the starting and ending points of each seismic 2D-section. The coordinates of an intermediate point is also indicated when the section is not straight.

Acknowledgments

This work was conducted in the framework of an agreement between Sapienza University of Rome and the Italian Ministry of Economic Development, Direzione Generale per la Sicurezza anche Ambientale delle Attività Minerarie ed Energetiche – Ufficio Nazionale Minerario per gli Idrocarburi e le Georisorse. We thank Gilberto Dialuce (General Director of DG ISSEG of the Italian Economic Development Ministry) and Franco Terlizzese (former Director of DGS UNMIG of the Italian Economic Development Ministry) who designed and encouraged this agreement.

The Move[®] software was provided by Midland Valley Exploration Ltd. to the University of Sapienza (Rome) as Academic Software Licensing.

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