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Crustal modeling of the central part of the Northern Western Desert, Egypt using gravity data

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1 **Crustal modeling of the central part of the Northern Western Desert, Egypt using**
2 **gravity data**

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8
9 **Abstract**

10 The Bouguer anomaly map of the central part of the Northern Western Desert,
11 Egypt was used to construct six 2D gravity models to investigate the nature, physical
12 properties and structures of the crust and upper mantle. The crustal models were constrained
13 and constructed by integrating results from different geophysical techniques and available
14 geological information. The depth to the basement surface, from eight wells existed across the
15 study area, and the depth to the Conrad and Moho interfaces as well as physical properties of
16 sediments, basement, crust and upper mantle from previous petrophysical and crustal studies
17 were used to establish the gravity models. Euler deconvolution technique was carried on the
18 Bouguer anomaly map to detect the subsurface fault trends. Edge detection techniques were
19 calculated to outlines the boundaries of subsurface structural features. Basement structural
20 map was interpreted to reveal the subsurface structural setting of the area.

21 The crustal models reveals increasing of gravity field from the south to the north due
22 to northward thinning of the crust. The models reveals also deformed and rugged basement
23 surface with northward depth increasing from 1.6 km to 6 km. In contrast to the basement, the
24 Conrad and Moho interfaces are nearly flat and get shallower northward where the depth to
25 the Conrad or the thickness of the upper crust ranges from 18 km to 21 km while the depth to
26 the Moho (crustal thickness) ranges from 31.5 km to 34 km. The crust beneath the study area

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