Mapping the Internal Structure of Sand Dunes in the Jafurah Sand Sea of Eastern Saudi Arabia using Ground Penetrating Radar.

BY

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THESIS ABSTRACT

Name: Ademola Quadri Adetunji

Title: Mapping the Internal Structure of Sand Dunes in the Jafurah Sand Sea of Eastern Saudi Arabia using Ground Penetrating Radar

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Three-Dimensional Ground Penetrating Radar (GPR) surveys were conducted in two locations to map the internal structure of sand dunes in eastern Saudi Arabia. The 400 MHz antenna that was used achieved a 4 m to 6 m penetration depth. The excellent spatial resolution of about 8 cm made it possible to identify the major internal features, such as cross-stratification and bounding surfaces.

The recorded radargrams proved useful in understanding the dune's growth and migration in this area. Results suggest that GPR is an important tool in any study of recent sand dunes as analogues of hydrocarbon sandstone reservoirs of aeolian origin.

Laboratory analyses showed the presence of elevated amounts of iron-oxide-bearing minerals in some dark layers of the sand in the study area. These changes in iron content might be the reason behind the strong electromagnetic impedance contrasts that ultimately generate reflections on the GPR images.

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الخلاصـــــة

الاسم: اديمولا قادري ادوتنجي

العنوان: تخطيط التركيب الداخلي للكثبان الرملية في صحراء الجافورة في شرق المملكة باستخدام رادار الجس الأرضي

التخصص الرئيسي: الجيوفيزياء

التاريخ: ابريل 2008م

تم إستخدام رادار الجس الأرضي ثلاثي الأبعاد في موقعين لتخطيط التركيب الداخلي للكثبان الرملية في شرق المملكة العربية السعودية حيث تم استخدام الهوائي بتردد 400 ميجاهيرتز والذي استطاع أن يصل إلى عمق من 4 – 6 م . و تقدر درجة الوضوح ب 8 سم مما جعل من الممكن التمييز بين الوحدات الداخلية مثل التطبق المتقاطع وحدود السطوح .

أثبتت قياسات رادار الجس الأرضي أهميتها في فهم نمو وهجرة الكثبان الرملية في المنطقة . وبناء على النتائج فإننا نقترح بأن رادار الجس الأرضي أداة مهمة في دراسة أي كثبان رملية حديثة كنظائر لخزانات البترول الرملية ذات الأصل الهوائي.

أظهرت التحليلات المخبرية وجود كميات مرتفعة من بعض المعادن المغناطيسية كأكاسيد الحديد في الطبقات ذات اللون الداكن في منطقة الدراسة. هذه المعادن المغناطيسية قد تكون السبب في وجود مقاومة كهرومغناطيسية تولد الانعكاسات المرئية على صور رادار الجس الأرضي.

درجة الماجستير في العلوم

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