PDO’s geological studies in the Sharquiya Sands offer a vital insight into the way oil and gas reservoirs are formed.
A trench in Wadi Batha, in the Western part of the Sharquiya Sands. In the upper part of the trench are wadi gravels, dark due to the presence of ophiolite pebbles and some volcanic rocks. Below are aeolian crossbedded sands.
Oman has many geological wonders; did you know, for example, that this country boasts the world’s second largest cave chamber, at Majlis Al Jinn? One of the biggest geological draws, however, is the Sharquiya Sands.

This 12,000 square kilometre desert, formerly known as the Wahiba Sands, has been described as a “perfect specimen of a sand sea”. It is situated in the eastern corner of Oman, between the Hajar Mountains in the North and the Arabian Sea in the South and East, while to the West are boulder-strewn gravel plains extending to the Rub’ al-Khali desert and the border of the Kingdom of Saudi Arabia.

The term ‘sand sea’ comes from the wave-like effect of the different dunes as they overlap each other. The North and central portion of the Sands are believed to be the oldest, their reddish colour coming from an iron-oxide coating on the sand grains that takes many centuries to form. By contrast, the sand in the south is light yellow, almost white in colour.

But what really interests PDO is that beneath the loose sands of the modern dunes lies a vast rock shelf of fossilised ancient dunes (known as aeolianite) - the largest in the world. The rock appears as cliffs on the coast and as escarpments in the West. It also forms the floors of some of the deep valleys between the dunes.

This rock provides vital clues to Oman’s geological past, but what makes it really attractive to geologists is that everything is situated either at the surface or just below it, making it easily accessible.

Oil and gas accumulations are formed when oil generated from the decay & heating of organic matter, migrates into porous rock and is subsequently trapped by impermeable rock, usually hundreds of metres under the ground. The Sharquiya Sands are not thought to contain any oil, since their oil and gas bearing rocks are overlain by porous rock which has allowed the hydrocarbons to leak away, but their similarities with the actual reservoirs mean they can act as living test laboratories to help build a more complete picture of them.
The Sharquiya Sands

Back in 1985 the Sharquiya Sands were chosen by the Royal Geographical Society (RGS) for one of the first major scientific research projects to focus on a desert environment.

Between December 1985 and April 1986 some 32 research assignments were carried out across the Sands, creating an encyclopaedia of knowledge that still acts as a valuable resource for today's scientists.

The RGS chose the Sharquiya Sands because no other body of sand in the world contains such a large range of sandy terrains, coupled with evidence of human occupation in Neolithic times (8,000BC to 5,000BC) and of environmental changes over tens of thousands of years.

The expedition operated from a main camp at al-Minitrib, with a field base operating from Qarhat Muammar on the eastern margin of the Sands. Scientists also mastered the art of driving in soft sand to operate mobile bases from Land Rovers - a forerunner of the many weekend vacationers who traverse the Sands in 4x4s today.

Digging for greater understanding

This trench (see photo on page 10) has been dug in Wadi Batha, in the western part of the Sharquiya Sands. The bedrock is composed of the sedimentary strata of the Sharquiya Sands, which are about 100 million years old. The strata are composed of sandstone, shale, and siltstone, which were deposited in a marine environment. The strata are well preserved and have provided important information about the geologic history of the region.

The geologic structures observed in the trench include folds, faults, and unconformities, which are important for understanding the tectonic history of the region. The geologist can use these structures to infer the direction of tectonic forces and the timing of tectonic events.

The geologic data collected from the trench can be used to constrain the age of the sedimentary strata and to determine the rate of sedimentation over time. This information can be used to construct geologic time scales, which are used to correlate geologic events across the region.

The geologic data collected from the trench can also be used to infer the paleo-environment of the region, which can provide important information about past climate and vegetation. This information can be used to infer the effects of climate change on the region and to predict future climate change.

The geologic data collected from the trench can also be used to infer the effects of tectonic activity on the region, which can provide important information about the present and future hazards. This information can be used to inform land use planning and to protect the region from natural hazards.

The geologic data collected from the trench can also be used to infer the effects of human activity on the region, which can provide important information about the effects of human activity on the environment. This information can be used to inform policy and to protect the region from human-induced hazards.

The geologic data collected from the trench can also be used to infer the effects of anthropogenic activity on the region, which can provide important information about the effects of human activity on the environment. This information can be used to inform policy and to protect the region from human-induced hazards.
About a million years ago a drop in the sea level exposed the sea bed, from which sands blew inland to form the first of a succession of sand seas at Sharquiya. Most sand deserts are formed from silicate mineral grains and rock fragments, but Sharquiya's early dunes contained mainly calcium carbonate and magnesium carbonate particles, derived from the shells of marine animals or separated out from sea water by marine algae.

When the sea level rose again during a later, wetter period, these carbonate particles dissolved, cementing the ancient dunes together into aeolianite rock, thus preserving evidence of how they were formed.

The cemented dunes were then eroded by strong winds during another dry period, with the sand produced by this erosion blowing inland to form the huge ridges that dominate the central and northern portions of today's desert.

Later, more sand blew in from the coast to form a new layer of dunes on top of the remains of the ancient, planed-off ones.

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