Nullarbor region once full of fast-flowing rivers

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(Phys.org)—University of Adelaide geologists have shed new light on the origin of Australia's largest delta, the Ceduna Delta, and the river systems which drained the continent millions of years before the Murray-Darling system came into existence.

It has long been thought that a massive river system, almost 2000km long, extended from Queensland's eastern margin and entered the sea near Ceduna, depositing enormous quantities of sediment from across the continent.

In contrast, this research has revealed that between 85 and 70 million years ago the river system depositing sediment into the delta was restricted to a series of smaller, fast-flowing rivers in the area around Ceduna. This area was being uplifted as Australia and Antarctica began to break apart, forming a series of hills which were then eroded, producing a more subdued landscape that today encompasses the Nullarbor Plain.

The University of Adelaide researchers are the first to analyse the ages of mineral grains contained in sediments from the only well drilled to date into the centre of the delta in the Great Australian Bight - revealing the nature and original sources of the sediment.

"By analysing this sediment, we've been able to reconstruct the landscape and major river drainage systems of the Australian continent about 80 million years ago," said project leader Dr Simon Holford. "It also gives us a better understanding of the hydrocarbon potential - the possibility of economic oil and gas production - from the region.

"To understand the hydrocarbon potential, we need to know the origin and nature of the reservoir rocks."

The 700km-wide Ceduna Delta, off the West Coast of South Australia, is about the same size as the Niger Delta in Western Africa, containing about 0.5 million cubic kilometres of sedimentary rock including sandstones and shales.

Many deltas contain large hydrocarbon reserves, and last year BP

announced it would invest up to $1.4 billion exploring the Ceduna Delta for oil and gas.

Analysing the sediment, Dr Holford, PhD candidate Justin MacDonald, fellow researchers and Melbourne-based Geotrack International Pty Ltd, dated almost 1000 grains of the mineral zircon from the well's core samples.

"By looking at the distribution of the ages of the minerals, we were able to identify different 'age populations' of zircon and produce a model of a river system which transported these minerals and deposited them on the margin of the continent," Dr Holford said.

"Our results showed that most of the sediment was derived much closer to the Great Australian Bight than has been previously thought. It gives us a much better handle on the geology and geomorphology of Australia 85-70 million years ago."

The research has been published in the *Journal of the Geological Society*.

Provided by University of Adelaide