

NW NELSON FIELDTRIP

MODERN AND ANCIENT SHALLOW MARINE AND NEAR-SHORE SEDIMENTARY ENVIRONMENTS



INTRODUCTION

The NW of New Zealand's South Island provides a unique opportunity to compare examples of both modern and ancient shallow marine and near-shore sedimentary environments. The southern extent of the Taranaki Basin outcrops onshore, with the Pakawau Group (Lower Cretaceous), Paleocene (Farewell Formation) and Eocene (Mangahewa and Kaimiro Formations equivalents) all in outcrop.

OBJECTIVES

Compare and contrast varying types of deltaic systems. Estuarine systems, wave-dominated shoreface facies and fluvial-dominated deltaic systems will be observed in both the rock record and in the modern sedimentary environments observed along the NW Nelson coastline.

AUDIENCE

This fieldtrip is applicable to sedimentologists, petroleum geologists, geophysicists, petrophysicists, structural geologists, general geoscientists and reservoir engineers.



Fiona Burns – Has a PhD in sedimentology, ichnology and diagenesis. For the past 20+ years she has provided integrated core, wireline log and image log interpretations to petroleum companies in Australia, New Zealand, North Sea and throughout SE Asia. She has also held research fellow positions at Curtin and UWA Universities.

Carl Stark - (M.Sc) is a sedimentologist with over 20 years' experience in the oil and gas industry, specialising in integrating core, wireline log and borehole images. He has collaborated on projects worldwide including Australia, SE Asia, India, West Africa and New Zealand.

DAY 1 – TAHUNANUI BEACH SECTION

SLOPE / SHELF COMPARISON

Visit an Oligocene (Whaingaroan) succession of sandstones, perigenic breccias and fossiliferous detrital conglomerates along a wave-cut platform at Magazine Point, Nelson. Identify differences between storm-derived and mass-transport deposits, observe fining-upwards and coarsening-upwards cycles and identify channel bases and major erosional events.

The afternoon incorporates a cycle from Nelson to Mapua around the Waimea Estuary, differentiating the wave-, tide-, and fluvial-dominated parts of the system.



DAY 2 – RANGIHAEATA AND WAINUI

FLUVIAL-DOMINATED DELTAIC SYSTEMS

The Rangihaeata location at the mouth of the Takaka River provides a unique opportunity to study a modern and ancient fluvial dominated lower delta plain system.

The Eocene Brunner Coal Measures consists of a broadly progradational succession. The basal sections are characterised by isolated fluvial channels bound by interdistributary muds and coals. The mid section is dominated by a series of stacked distributary channel sandstone packages. The uppermost succession consists of coarse-grained channel deposits with gravel lags, sharp-based erosive surfaces, pedogenic features and poorly developed coal horizons.

The afternoon switches to the Wainui Estuary, with a focus on modern processes including barrier bar development, tidal-inlet channel facies and sandy tidal flat systems.



DAY 3 – KAIHOKA BEACH SECTION

WAVE-DOMINATED SHALLOW MARINE DEPOSITS

The Kaihoka Beach outcrop provides a complete section of the uppermost Farewell Formation (Paleocene), the Abel Head Formation (Eocene) and Oligocene marine mudstones and carbonates.

The primary objective of this section is to observe the wave-dominated, shallow-marine successions of the Abel Head Formation, identifying parasequences and parasequence sets, sharp-based shoreface facies, and bedforms associated with wave-dominated processes and tidal-inlet channels.

You will also see the highly variable character of the sequence boundary between the Farwell Formation and Abel Head Formation

DAY 4 – OYSTER POINT

TIDE-DOMINATED SYSTEMS, FLUVIAL DEPOSITS

Oyster Point on the Whanganui Inlet marks the boundary between the Cretaceous uppermost Pakawau Group (Puponga Coal Measures Member) and the Paleocene, lowermost Farewell Formation (Kapuni Group).

Features observed in this section include tidal bars and channels and tidal-flat facies with an array of sedimentary structures such as wave and current ripples, convolute bedding, flaser and lenticular bedding.

This outcrop enables a discussion of the variation between non-marine versus marine coals, based on outcrop observations.

This is also a good opportunity to study the depositional architecture of the lower Farewell Formation.



DAY 5 - MANGARAKAU

MACRO-TIDAL ESTUARINE SYSTEM

The final day of the field trip focusses on the North Cape Formation, which forms part of the Cretaceous Pakawau Group, with the primary focus on a macro-tidal estuarine system.

We will study the bedforms associated with a stacked distributary channel complex. What differentiates these from the fluvial dominated distributary channels from Day 2? What is the lateral distribution of these distributary channels?

We will observe tidal flat deposits which display amalgamated double drape muds and/or fluid muds, bi-directional ripple laminations, starved ripples, flaser bedding, lenticular bedding and notable limited bioturbation.

We will also identify fringe facies including; coals, tidal creeks and inclined heterolithics.



For expressions of interest, possible dates and associated costs contact Carl Stark or Fiona Burns

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Based on the predicted tides for Nelson, potential dates available are:

Monday 25th of Feb – Friday 1st March 2019

Monday 11th of March – Friday 15th of March 2019

Wednesday 27th of March – Sunday 31st of March 2019

Friday 12th of April – Tuesday 16th of April 2019