THE FAUNA AND BIOSTRATIGRAPHY OF THE JURASSIC LATADY FORMATION, ANTARCTIC PENINSULA.

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Abstract

The Latady Formation is a suite of Middle to Late Jurassic (170 – 140 Ma) sedimentary rocks situated in the southeastern region of the Antarctic Peninsula near where the break-up of Gondwana probably began. Latady Formation strata comprise a ~2.8 km thick sequence of black and grey shale and siltstone, light brown sandstone, with subordinate conglomerate and sparse thin limestone and coal that accumulated in a back-arc position in the 'Bay of Antarctica'. The sediments record terrestrial through to distal-shelf environments and are abundantly fossiliferous in places. Substantial paleontological collections of ~3300 specimens from 219 localities were made during a British Antarctic Survey deep field expedition to the Orville Coast in the 1999/2000 field season.

The majority of fossils in the Latady Formation are poorly preserved internal and external moulds. Such material makes taxonomic description difficult. Nevertheless, a diverse, entirely marine fauna comprising 177 taxa (7 phyla, 93 genera) is recorded, dominated by marine invertebrates, predominantly bivalves, but also cephalopods, brachiopods, echinoderms, annelids, an arthropod, and a solitary coral. Vertebrates constitute a minor component (4 specimens), consisting of at least two, possibly three, species of fish and the second marine reptile recorded from the Antarctic Peninsula. 15 new species are described (but not named) in the following genera: '*Paracerithium*', *Lopatinia* (s.l.), *Modiolus*, *Pinna*, *Retroceramus*, *Oxytoma*, *Meleagrinella*, *Camptonectes* (*Camptochlamys*), *Myophorella* (*Scaphogonia*), *Vaugonia* (3 species), *Pronoella*, *Goniomya*, and *Pentacrinites*, and there are a further 21 species too poorly preserved for description but likely to be new.

Fifteen distinct faunal assemblages are recognised and named after the dominant species: *Retroceramus* cf. *stehni*, *R.* sp. C ?cf. *galoi*, *Meleagrinella* n. sp, *Pterotrigonia thomsoni*, *Entolium spedeni*, *Neocrassina marwicki*, *N. ellsworthensis*, *Flabellirhynchia australensis*, *Pleuromya* spp., *Chariocrinus latadiensis*, '*Paracerithium*' n. sp., *Malayomaorica malayomaorica*, *M. occidentalis*, *Retroceramus* sp. indet. D., and *Blanfordiceras* cf. *wallichi*. These characterise environments ranging from sublittoral to distal-shelf. Collectively, the fauna, taphonomic signatures, assemblages, sediments, and sedimentary structures record an increase in depth from inner- to mid-shelf settings in the Bajocian, through outer-mid shelf during the Kimmeridgian, to outer-shelf depths in the Tithonian. Hence, a general trend of decreasing energy and increasing depth through time is observed.

Bathonian and Callovian strata are recognised for the first time in the Latady Formation and the presence of strata of Bajocian, Oxfordian, Kimmeridgian, and Tithonian age is further verified. Generic affinities of the fauna are Tethyan (e.g. aff. *Cyathophylliopsis*, *Lopatinia*, *Oxytoma*, *Camptonectes*, *Pronoella*, *Anisocardia*, *Teloceras*, *Normannites*, *Perisphinctes*, *Cycleryon*,

Chariocrinus, *Pentacrinites*), whereas at specific level they are with coeval New Zealand faunas (e.g. *Pinna* n. sp, *P. kawhiana*, *Oxytoma trechmanni*, *O.* n. sp., *Aucklandirhynchia* cf. *aucklandica*, '*Paracerithium*' n. sp., *Hibolithes* aff. *catlinensis*, *Belemnopsis* aff. *deborahae*). South American affinities are also shown by the presence of *Retroceramus* cf. *stehni*, *Pachysphinctes* aff. *americanensis*, and *Aspidoceras* aff. *euomphalum*. Two influxes of Tethyan fauna to the 'Bay of Antarctica' occurred in the Bajocian (e.g. *Grammatodon* sp., *Oxytoma trechmanni*, *O.* n. sp., *Camptonectes grandis*) and Callovian (e.g. aff. *Cyathophylliopsis delabechei*, *Cucullaea* (*Idonearca*) sp., *Camptonectes auritus*, *Mesosaccella* sp., *Pronoella* spp.) most likely through the Trans-Ethyraean Seaway. The migration route was a short-lived epicontinental seaway formed during transgressions. Apart from the migration of Tethyan taxa, no other evidence of eustatic cycle influence is seen in Latady sediments and the dominant control of relative sea-level was local tectonism. The widespread cephalopod-byssate bivalve biofacies occurs later in the Latady Formation than in other southern Gondwanan sequences, but once established dominates the entire Late Jurassic. Typical constituents of the biofacies present in the Latady Formation include *Retroceramus* n. sp. A., *R.* aff. *galoi*, *R.* sp. B ?cf. *galoi*, *R.* spp. indet. D, E, F, *Malayomaorica malayomaorica*, *M. occidentalis*, *Hibolithes* spp., *Belemnopsis* spp., *Pachyduvalia* spp., *Pachysphinctes* spp., *Torquatisphinctes* spp., *Virgatosphinctes* spp., and *Kossmatia* spp. Individual horizons change from bivalve dominated in the Kimmeridgian – Middle Tithonian to ammonite dominated in the latest Tithonian.

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