1 Introduction

The Suffolk coast is a frontier landscape where the North Sea recycles land, a process which has been happening for million of years. While visitors may experience the beauty and tranquility of this coast, local towns and villages know that the North Sea gives with one hand and takes away with the other. Shingle can bank up in one place while metres of cliff disappear overnight in another. Dynamic sites such as Orford Ness symbolise the balance between creation and destruction played out by land, sea and air along the Suffolk coast, and they represent true wilderness.

Key factors are the ready availability of mud, sand and shingle, and their lack of resistance to the sea. The Suffolk coast has advanced and retreated many times on the western edge of the North Sea, and its soft sediments have continually been rearranged. It is one of the youngest parts of Britain, and has much in common with the Low Countries; we may contrast it with the indelible granites of Lands End or Ben Nevis. In Eocene times (56 to ~34 million years ago) this area was part of a tropical sea; in the Pliocene, from around 5.3 million years ago, it lay under temperate waters. A mere 450,000 years ago it groaned under an ice sheet perhaps half a mile thick. Each period has left a temporary legacy in the rocks of Suffolk: a wealth of sands, gravels, silts, clays and limestones. The result is a complex archive of evidence about past life, including humans.

Suffolk's geology is rich in evidence for natural environmental change, particularly the succession of climatic shifts over the last 4 million years. Today we are entering the Anthropocene Epoch, when the effects of human activity are becoming widely marked in the geological record, and human-induced climate change is underway. The closest historical analogue we have for the predicted climate of 2100 AD is the mid-Pliocene warm period, about 3 million years ago, when the earliest Red Crag strata were laid down and global mean temperatures were 2 to 3º C higher than today. Looking forward a thousand years to 3000 AD, the closest likely analogue would be the Earth during the early Eocene Epoch, c.50 million years ago, when the London Clay was being deposited and the world was perhaps 6ºC warmer, and there little or no ice at the poles. Suffolk's geology invites us to understand more about the drivers of, and boundaries between, natural and human-generated climate change.

This book is intended as an introductory guide to the coastal geodiversity of Suffolk, the first of its kind. It focuses on the stretch from Pakefield to Felixstowe, taking in a range of publicly accessible geological features and landforms, telling the story of the physical landscape we see today. Many of these places are designated Sites of Special Scientific Interest (SSSI) or County Geodiversity Sites. Using this book as a starting point, you may go on to discover them in more detail using the resources and references provided. A glossary is provided to give more detail about key words and concepts.

Confronted by the unfamiliar mass of sediments in the crumbling cliffs at Covehithe or the sea- sculpted shingle banks at Bawdsey, visitors may use this book to guide them through visible complexity towards the essentials of what there is to know. In doing so, I hope they will discover some fascinating new places. I also hope they will come to appreciate the dimension of deep time which underlies the world around us: the value of Suffolk's rocks and sediments as windows into the past and a guide to the future, and the temporary nature of everything we see.

The Suffolk coast is a place for contemplation as well as exploration.

Figures

(Figure 1) Shifting tidal bars at the mouth of the River Ore, Shingle Street, Hollesley.

(Figure 2) Ice Age drama at Bawdsey cliffs: grey mudstones of the London Clay were plastically deformed by the weight of ice sheet which deposited the brown till at the top of the cliff, so squeezing the gravelly sands of the Red Crag into a trough-like structure.

(Figure 3) The Eocene sea-bed c.53 million years ago, at Nacton Cliff. Pale bands of mudstone in the London Clay are evidence of volcanic ash falls into the sea. Carbon dioxide from these volcanoes contributed to making the early Eocene a 'greenhouse' world.

(Figure 4) 2 million years climate change graph Adapted from the chart 'Five million years of Climate Change from Sediment Cores' by RA Rohde, courtesy Wikipedia.

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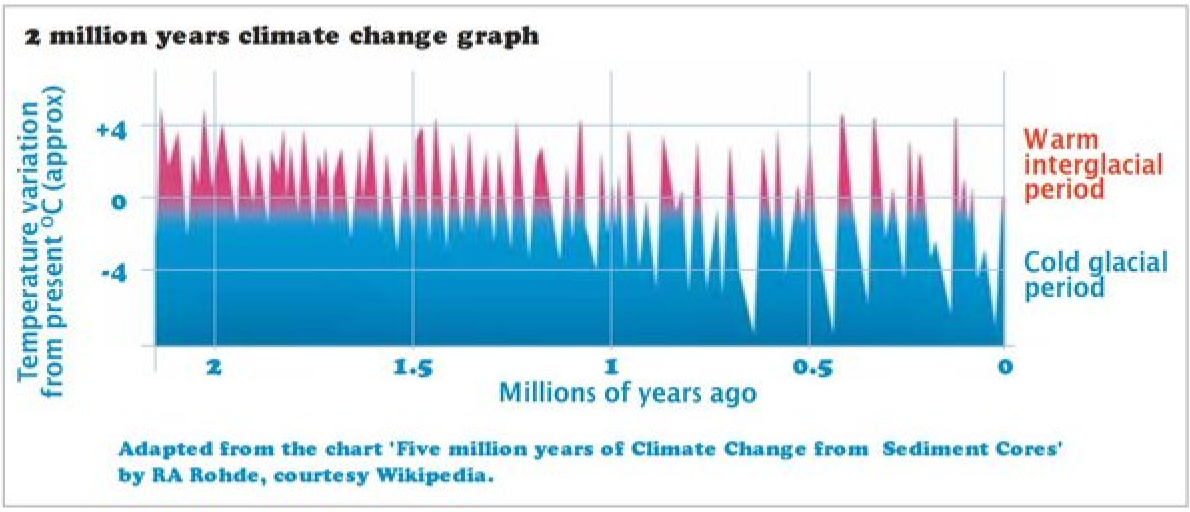

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