

# Foreword

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It seems that not a day goes by without the media reporting yet another extreme weather event. More and more often, these reported events are occurring close to home, in our country, if not our neighbourhood.

What does this trend reflect? Is it a media that is increasingly captivated by these events, perhaps aided by the modern ubiquity of dramatic video footage shot on mobile telephones by the people affected? Or is there a real upsurge in their frequency, intensity and resulting impacts?

While the media tends to focus on extreme weather events, longer-lasting climate extremes, such as droughts, receive less attention. This is despite their consequences being just as significant. The same applies to ocean extremes, although marine heatwaves are receiving more attention. The increased interest in marine heatwaves is not only a result of the growing awareness of the direct impact of ocean extremes on marine ecosystems but also because the increasing frequency and severity of marine heatwaves is paralleling the changes in atmospheric heatwaves and their serious consequences.

A single, authoritative and highly readable book that covers the full array of weather, climate and ocean extremes is long overdue, which is why I jumped at the opportunity to commission and publish the book you are currently reading. The book considers past changes in these extremes, often extending back to previous millennia,

as the evidence allows. In doing so, it provides robust evidence and explanations for the general increase in these extremes in the past. It also presents the key results of model-based future projections. These reveal how the same extremes are likely to change in the coming decades. Climate models also provide the opportunity to determine the extent to which observed changes in the frequency and intensity of the extremes can be attributed to human activities, rather than natural variability in the atmosphere–ocean system. This analysis can also be undertaken for an individual extreme event.

*Science of Weather, Climate and Ocean Extremes* is, therefore, a timely addition to Developments in Weather and Climate Science, the Royal Meteorological Society's new book series, published in partnership with Elsevier. Hay's contribution – drawing on his decades of unrivalled experience in academia, the private sector and governmental organisations – is consistent with the goal of the series being to combine the underpinning principles of the atmospheric, oceanic and climate sciences with recent developments in the field. Its multi-disciplinary approach brings together aspects of physics, mathematics, chemistry, computer science and other basic disciplines. In doing so, it cuts across these traditional subject boundaries, bringing together all the elements that are important for understanding atmospheric and ocean extremes. The book is thus an excellent

addition to the series. For this reason, I also look forward to Hay's next contribution to the series, with the forthcoming publication of

*Managing the Consequences of Weather, Climate and Ocean Extremes in Our Warming World.*

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*Developments in Weather and Climate Science  
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