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FOREWORD: REMEMBERING PROFESSOR DAVID SCOTT'S CONTRIBUTION TO THE IGCP COMMUNITY

Coastal communities are prone to a range of geohazards, including sea-level rise, storms, subsidence, earthquakes and tsunamis. These can result in major changes to our coastlines, causing loss of life, damage to infrastructure, economic hardship, and degradation of coastal ecosystems. A key scientific goal is the ability to forecast coastal response to the underlying driving mechanisms, enabling effective decision-making about how best to manage the coastal zone and reduce risk. Forecasting the response of coastal systems to driving mechanisms is best achieved using a multidisciplinary, community-driven, and collaborative approach that capitalises on knowledge learned from coasts around the world.

It is in this very spirit of multidisciplinary and international community-driven collaboration that the International Geoscience Programme (IGCP) has addressed some of the most pressing issues facing coastlines over the last several decades. IGCP serves as a knowledge hub of The United Nations Educational, Scientific, and Cultural Organization (UNESCO) and fosters international collaboration in the geosciences by supporting multi-year projects that bring together international experts from academia, government, and industry. Among IGCP's mandates is the aim to better understand, predict, and mitigate climate change and geohazards. Beginning in the 1970s, several IGCP projects have been initiated by international teams of experts, all of which tackled timely knowledge gaps facing the geoscience community.

With regards to the coastal sciences, IGCP projects have addressed topics including *Sea-Level Correlation and Applications* (IGCP Project 200), *Coastal Evolution of the Quaternary* (IGCP Project 274), *Late Quaternary Coastal Records of Rapid Change* (IGCP Project 367), *Coastal Environmental Change During Sea-Level Highstands* (IGCP Project 437), *Quaternary Land-Ocean Interactions: Driving Mechanisms and Coastal Responses* (IGCP Project 495), *Preparing for Coastal Change* (IGCP Project 588), *Sea Level from Minutes to Millennia* (IGCP Project 639), and most recently, *Forecasting Coastal Change* (IGCP Project 725). These projects have expanded and continue to expand the geographic focus of coastal studies to include areas of the globe that are underrepresented in the scientific literature, bring together a diverse coastal community with significant representation from early career researchers and developing nation scientists, and push field, laboratory, and modelling methodologies forward to address questions that aim to improve understanding of the mechanisms of coastal change and the processes and rates in which coastlines respond to change.

As leaders and participants in the current IGCP Project 725 *Forecasting Coastal Change*, we owe a debt of gratitude to the early leaders who blazed the IGCP trail, and, in doing so, developed strategic ways of bringing the international coastal community together and fostering meaningful collaboration over a breadth of disciplinary expertise (including historians, archaeologists, geoscientists, and modellers) to share and discuss the latest findings and advancements in sea-level, sedimentological, and coastal-process research. One such pioneer was the late Professor David Scott, an internationally renowned Quaternary geologist, with a keen interest in using foraminifera to solve problems in the coastal geosciences. Dave contributed as a disciplinary expert to IGCP projects 200, 274, and 437 and was at the at the helm of the particularly influential IGCP Project 367 that ran from 1994 to 1998.

Previous IGCP projects, of which Dave Scott played a role in shaping, largely focussed on geological records of former sea levels, coastal dynamics, and related geohazards, and have been instrumental in advancing the methodology, interpretation, and standardisation of approaches to understand these hazards and their impact on the world's coastlines (e.g., Scott et al., 1989; Pluet and Pirazzoli, 1991; Shennan et al., 2015). Interrogation of the coastal geological/stratigraphic record has, for example, allowed us to supplement and extend instrumental and historical records of sea-level change, coastal dynamics, and coastal seismic hazards (Atwater, 1987; Donnelly et al., 2004; Maio et al., 2014). An approach common to many of these studies is the robust application of microfossils to paleo-reconstructions, the focus of this Special Issue, and the core passion of Dave Scott. Together, this work has improved our understanding of 'baseline' conditions against which contemporary observations can be compared and contextualised (Kopp et al., 2016), and has provided a holistic view of the magnitude and frequency of hazardous events, such as storms, earthquakes, and tsunamis (Rubin et al., 2017; Bregy et al., 2018). Standardised and integrated geological records from around the world have also refined our understanding of the mechanisms and drivers of sea-level and coastal change (Hawkes et al., 2011; Gehrels et al., 2020).

While it has never been the primary focus of these previous coastal IGCP projects, numerical modelling of coastal systems has been an implicit component, which has allowed field data and conceptual models to be integrated to achieve synergistic outcomes. For example, even relatively simple models of coastal evolution reveal how cyclic or episodic coastal morphological behaviour can arise autogenically, rather than from allogenic climatic or sea-level forcing, as may be presumed from field mapping alone (Hein & Ashton, 2020). However, inappropriate application and limited integration of field data and modelling can result in significant debate and potentially erroneous conclusions (Cooper et al., 2020). In addition, the accuracy of model forecasts can be heavily influenced by assumed, yet inaccurate and/or poorly constrained, field data and behaviour (see e.g. Brain et al., 2011). It is on the basis of the foundational work by past IGCP project leaders, including Dave Scott, that we, as leaders of the current IGCP 725 Project *Forecasting Coastal Change*, continue to advance the coastal sciences by making strides to bring two groups of scientists (field/process geologists and numerical modellers) together to tackle the aforementioned challenges. Though the scope is broader, the field of micropaleontology inhabited by Dave Scott is at the

core of IGCP Project 725, having provided (and continuing to provide) many of the fundamental paleorecords to which our forecasts of future coastal change are grounded.

On behalf of IGCP Project 725, we thank Dave Scott for his extensive service to the IGCP community over the years and for providing a roadmap that all subsequent projects have been able to follow and build on.

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REFERENCES

Atwater, B. F., 1987, Evidence of great Holocene earthquakes along the outer coast of Washington state: Science, v. 236, p. 942–944.
Brain, M. J., Long, A. J., Petley, D. N., Horton, B. P., and Allison, R. J., 2011, Compression behaviour of minerogenic low energy intertidal sediments: Sedimentary Geology, v. 233, p. 28–41.
Bregy, J. C., Wallace, D. J., Totten Minzoni, R., and Cruz, V. J., 2018, 2500-year paleotempestological record of intense storms for the northern Gulf of Mexico, United States: Marine Geology, v. 396, p. 26–42.
Cooper, J. A. G. Masselink, G., Coco, G., Short, A.D., Castelle, B., Rogers, K., Anthony, E., Green, A. N., Kelley, J. T., Pilkey, O. H., and Jackson, D. W. T., 2020, Sandy beaches can survive sea-level rise: Nature Climate Change, v. 10, p. 993–995.
Donnelly, J. P., Cleary, P., Newby, P., and Ettinger, R., 2004, Coupling instrumental and geological records of sea-level change: Evidence from southern New England of an increase in the rate of sea-level rise in the late 19th century: Geophysical Research Letters, v. 31, L05203.
Gehrels, W. R., Dangendorf, S., Barlow, N. L. M., Saher, M. H., Long, A. J., Woodworth, P. L., Piecuch, C. G., and Berk, K., 2020, A Preindustrial Sea-Level Rise Hotspot Along the Atlantic Coast of North America: Geophysical Research Letters, v. 47, p. 4.
Hawkes, A. D., Horton, B. P., Nelson, A. R., and Hill, D. F., 2011, The application of intertidal foraminifera to reconstruct coastal subsidence during the giant Cascadia earthquake of AD 1700 in Oregon, USA: Quaternary International, v. 221, p. 116–140.
Hein, C. J., and Ashton, A. D., 2020, Long-term shoreline morphodynamics: Processes and preservation of environmental signals, *In:* Jackson, D. and Short, A. (eds), Sandy Beach Morphodynamics: Elsevier, p. 487–531.
Kopp, R. E., Kemp, A. C., Bitterman, K., Horton, B. P., Donnelly, J. P., Gehrels, W. R., Hay, C. C., Mitrovica, J. X., Morrow, E. D., and Rahmstorf, S., 2016, Temperature-driven global sea-level variability in the Common Era: Proceedings of the National Academy of Sciences v. 113, p. E1434–E1441.
Maio, C. V., Gontz, A. M., Weidman, C. R., and Donnelly, J. P., 2014, Late Holocene marine transgression and the drowning of a coastal forest: Lessons from the past, Cape Cod, Massachusetts, USA: Palaeogeography, Palaeoclimatology, Palaeoecology, v. 393, p. 146–158.
Pluet, J., and Pirazzoli, P. A., 1991, World Atlas of Holocene Sea-Level Changes. Elsevier Oceanography Series, Vol. 58.
Rubin, C. M., Horton, B. P., Sieh, K., Pilarczyk, J. E., Daly, P., Ismail, N., and Parnell, A. C., 2017, Highly variable recurrence of tsunamis in the 7,400 years before the 2004 Indian Ocean tsunami: Nature Communications, v. 8, p. 16019.
Scott, D. B., Pirazolli, P. A., and Honig, C.A. (Eds.), 1989, Late Quaternary Sea-Level Correlation and Applications. NATO Science Series C: 256: Springer Netherlands.
Shennan, I., Long, A. J., and Horton, B. P. (Eds.), 2015, Handbook of Sea-Level Research: Wiley.