

Research Facilitated by Scuba

Introduction

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Scuba has played a critical role in marine research. The use of scuba as a research tool has been validated by the quantity and quality of scientific output published in high-impact journals that is cited in this volume. This volume further endorses the strong integration of scientific diving within the overall science domain: “The history of marine research has provided numerous examples of mysteries that would still be unsolved and findings that would have been misinterpreted with confidence if not for direct observation on scuba” (Witman et al., this volume).

The first thirteen papers reported research findings and discoveries around the world in environments such as coral reefs, oceanic blue water, under-ice polar habitats, and temperate kelp forests, providing perspectives on ecological scales and function, physiology, symbiosis and chemistry, biodiversity and behavior, and structured populations. These papers weave scuba through the science, often with a historical and developmental perspective on methods and techniques.

The end product of scientific diving activities is the advancement of science. The following six papers are illustrative of underwater research that was not only greatly facilitated by scuba, but could perhaps not have been accomplished without it. The biology of several marine systems is reported in research involving substantial, often decadal, scuba use. The topics include biological studies on the coral holobiont, ecological roles of major algal groups on reefs, the significance of synchronized sexual reproduction in green algae, and the functional role of small and cryptic metazoans on coral reefs. The research facilitated by scuba and reported in these papers focuses on the scientific results, not necessarily on the research methodologies using scuba to obtain those data and observations, and includes several case studies. Where appropriate, laboratory studies complementary to underwater field observations are referenced.