Trójmiejska Szkoła Doktorska Polskiej Akademii Nauk (TSD PAN), prowadzona wspólnie przez Instytut Maszyn Przepływowych PAN (IMP PAN), Instytut Budownictwa Wodnego PAN (IBW PAN) oraz Instytut Oceanologii PAN (IO PAN), została utworzona w 2019. Szkoła Doktorska oferuje kształcenie w ramach trzech dyscyplin: inżynierii mechanicznej, inżynierii lądowej i transportu oraz nauki o Ziemi i środowisku.

Monografia jest podsumowaniem aktywności naukowej TSD PAN w dyscyplinie nauki o Ziemi i środowisku w 2021 r. i zawiera zbiór prac naukowych przygotowanych przez doktorantów Szkoły Doktorskiej.

The Tricity Doctoral School of the Polish Academy of Sciences (TSD PAN), run jointly by the Institute of Fluid-Flow Machinery of the Polish Academy of Sciences (IMP PAN), the Institute of Hydro-Engineering of the Polish Academy of Sciences (IBW PAN) and the Institute of Oceanology of the Polish Academy of Sciences (IO PAN), was established in 2019. The Doctoral School offers education in three disciplines: Mechanical Engineering, Civil Engineering and Transportation as well as Earth and Environmental Science.

The monograph is a summary of the TSD PAN scientific activity from the discipline of Earth and related environmental sciences and contains a collection of scientific papers prepared by PhD students of the Doctoral School in 2021.

TSD PAN

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Preface

In 2019 the Tricity Doctoral School of the Polish Academy of Sciences (TSD PAN) was established, which is run jointly by the Institute of Fluid Flow Machinery of the Polish Academy of Sciences (IMP PAN), the Institute of Hydro-Engineering of the Polish Academy of Sciences (IBW PAN) and the Institute of Oceanology of the Polish Academy of Sciences (IO PAN). The Doctoral School offers education in three disciplines: Mechanical Engineering, Civil Engineering and Transportation and Earth and Environmental Science.

It is my great pleasure to present you a monograph which is a summary of the consecutive year of TSD PAN scientific activity, including scientific papers proposed by PhD students of the Doctoral School. This monograph contains a collection of papers from the discipline of Earth and related environmental sciences. Their short summaries were presented by PhD students of TSD PAN during the 2^{nd} Scientific Seminar of TSD PAN, which took place on June 16^{th}–17^{th}, 2021. This event is a continuation of a series of annual open scientific seminars where PhD students of the Doctoral School present their scientific achievements.

dr hab. inż. Magdalena Mieloszyk, profesor IMP PAN
Director of the Tricity Doctoral School,
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Foreword

This volume comprises of four short papers authored by PhD students from IO PAN, young researchers at the beginning of their adventure with science. Papers cover marine research areas of marine acoustics, chemistry of the Baltic Sea water, and two of them are devoted to palaeoceanography; relatively new, quickly gaining attention and importance branch of oceanography. If the papers are diverse of topics, their common feature is introductory character to the subject of research. That reflects the early stage of their PhD projects and education at TSD PAN. But that is very fortunate for the readers, especially ones less familiar with the subjects. I read it with interest, and I look forward for the interesting results of their research.

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