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CLIMATE CHANGE AS AN OCEAN GOVERNANCE CHALLENGE

Abstract

Ocean law has developed greatly in the recent years as an area within maritime law and environmental law. The increased attention has been received mainly due to the sea-level rise, ocean acidification and changing ocean currents caused by climate change. The negative impacts of climate change affect a wide spectrum of law and policy and have direct and indirect implications on various aspects such as: international security, food security, shipping, fisheries, marine and coastal governance etc. According to the IPCC 2018 Report, ocean ecosystems are already experiencing large-scale changes and critical thresholds are expected to be reached at higher levels of global warming. The main aim of this article is to present how the ocean law and climate law respond to the regulatory challenges caused by climate change.

Keywords: climate change, ocean governance, mitigation, adaptation, climate law, coastal management, ocean law, small islands

„The effects of a warming planet are being felt from
the ocean depths to the mountaintops.”

U.N. Secretary General, António Guterres,
at COP26, Glasgow 2021

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INTRODUCTION

The ocean is the largest solar energy collector on the Earth. It covers more than 70% of Earth's surface, it is the planet's largest biosphere and home to up to 80% of all life in the world. It generates 50% of the oxygen we need, absorbs 25% of all carbon dioxide emissions and captures 90% of the additional heat generated from those emissions. It is not just 'the lungs of the planet' but also its largest carbon sink - a vital buffer against the impacts of climate change.¹ This incredible ability to store and release heat over long periods of time gives the ocean a central role in stabilizing Earth's climate system. The main source of ocean heat is sunlight, but clouds, water vapor and greenhouse gases emit heat that they have absorbed, and some of that heat energy enters the ocean. Waves, tides and currents constantly mix the ocean, moving heat from warmer to cooler latitudes and to deeper levels.²

According to the IPCC 2018 Report, ocean ecosystems are already experiencing large-scale changes and critical thresholds are expected to be reached at higher levels of global warming. The impacts and risks of climate change include air and water temperature warming, seasonal shifts in species, coral bleaching, sea level rise, coastal inundation, coastal erosion, harmful algal blooms, hypoxic (or dead) zones, new marine diseases, loss of marine biodiversity, changes in levels of precipitation, and fishery declines.³ Since the 20th-century, sea-levels have risen six to eight inches globally, though this rate has not been consistent. The variation in sea-level rise is likely due to postglacial rebound, changes to the Atlantic Ocean circulation, and the melting of the Antarctic Ice Sheet.⁴ Climate scientists have been asking a question whether crucial system of ocean currents is faltering because of climate change. If so, then the consequences could include faster sea level rise along the United States East Coast and Europe, stronger hurricanes in United States, reduced rainfalls across Africa and changes in tropical monsoon systems.⁵ The effects of extreme storms and rising seas are intangible and will become impossible to

¹ <https://www.un.org/en/conferences/ocean2022/about> (accessed: 16 July 2022).

² L. Dahlman, R. Lindsey, *Climate change: Ocean Heat Content*, published Aug.17, 2020, updated Oct. 12, 2021 at: <https://www.climate.gov/news-features/understanding-climate/climate-change-ocean-heat-content> (accessed: 11 July 2022).

³ <https://oceanfdn.org/ocean-and-climate-change/> (accessed: 11 July 2022).

⁴ Woods Hole Oceanographic Institution. (2019). *Understanding Sea Level Rise: An in-depth look at three factors contributing to sea-level rise along the U.S. East Coast and how scientists are studying the phenomenon*. Produced in Collaboration with Christopher Piecuch, Woods Hole Oceanographic Institution. Woods Hole (MA): WHOI.

⁵ H. Murphy, *A Crucial System of Ocean Currents Is Faltering, Research Suggests*, *The New York Times*, Aug. 5, 2021 and Aug. 6, 2021, Section A, Page 5 of the New York edition with the headline: System of Currents Is Slowing, Study Finds.

ignore. Associated impacts and risks for human societies, such as: damage, property loss, health problems, food shortages⁶ and infrastructure failures due to coastal storms and rising seas are unavoidable and already have significant socio-economic and health effects in some regions of the world.

Climate change is also one of the primary causes of the degradation of the polar environment and affects its landscape, flora and fauna.⁷ The Arctic is a unique area of Earth and the presence of ice makes this region particularly exposed to environmental degradation caused by climate change. Oceans are warming 40% faster than the United Nations predicted five years ago and impacts of climate change include changes to mountain cryosphere, polar regions and ecosystems, sea-level rise and coastal extremes.⁸ As a consequence of ice-melting, the level and temperature of the ice-covered seas increase and have a devastating impact on marine ecosystems leading to extinction of some species that live in cold temperatures. Changes in the polar environment may also cause negative impacts on interests other than environmental ones. For instance, the rights of indigenous people and their traditional ways of life might be endangered.⁹ Ice-melting may also lead to intensification of polluting activities such as oil and gas exploitation, commercial shipping and fishing¹⁰, and newly opened shipping lanes may provoke clash of sovereign interests in the Arctic region. The threat of degradation of the polar environment has led to the debate about the future of the region and the most effective regime of environmental management.¹¹

Ocean law has developed greatly in the past two decades as an area within maritime law and environmental law. The sustainable use and conservation of the world ocean and its resources represent one of the seventeen global goals set to 'transform our world' in the context of the United Nations (UN) 2030 Agenda for Sustainable Development¹². In the same time, climate law has

⁶ In 2014, the IPCC noted the threat to world food security deriving from climate change impacts on marine biodiversity.

⁷ O. Stokke, *Environmental Security in the Arctic*, International Journal 2011 (64), 839.

⁸ A study on the state of the Arctic, published in April 2019 in Environmental Research Letters and led by the renowned glaciologist Jason Box, found that ice in various forms is melting so rapidly that the 'Arctic biophysical system is now clearly trending away from its 20th-century state and into an unprecedented state, with implications not only within but also beyond the Arctic'.

⁹ P. Vigni, *The Governance of the Arctic Environment: The EU and US Contribution* [in:] Christine Bakker, Francesco Francioni (eds.), *The EU, the US and the Global Climate Governance*, Ashgate 2014, p. 22.

¹⁰ O. Stokke, *Environmental Security in the Arctic*, International Journal 2011 (64), 849-60.

¹¹ P. Vigni, *The Governance of the Arctic Environment...*, p. 225.

¹² *Transforming our world: the 2030 Agenda for Sustainable Development*, https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E (accessed: 17 July 2022).

become a new legal discipline and a subject of scientific and scholar debate¹³. It has been more than three decades since governments and scientists started officially meeting to discuss the need and instruments to lower greenhouse gas emissions to avoid the dangers of climate breakdown.¹⁴ Nevertheless, the amount of carbon dioxide in atmosphere has increased by over 35% since the Industrial Revolution, primarily from the burning of fossil fuels, and it continues to rise. The main aim of this article is to present how the ocean law and climate law respond to the regulatory challenges caused by climate change with special focus on the impact of climate change on low-lying small islands and coasts.

1. OCEAN & CLIMATE GOVERNANCE

Ocean governance, as part of the broader concept of global governance introduced by the Commission on Global Governance in 1995, consists of all the complex multilevel relations and processes through which ‘individuals and institutions, public and private’ attempt to manage maritime problems, accommodate diverse interests and cooperate through formal or informal arrangements.¹⁵ It means the coordination of various uses of the ocean and protection of the marine environment. Ocean governance is also defined as a process necessary to sustain ecosystem structure and functions.¹⁶ Climate change is definitely a global problem that needs to be addressed in a comprehensive manner at different levels of governance and within different sectoral policies. Climate change challenges require rapid operational responses and changes in the mentality of policy making and economic structures on behalf of both international institutions, states and non-state actors.¹⁷ One of the most important sources of the global ocean governance is the United

¹³ Development Goal 14: Life Below Water. See: Integrating Climate Change in Ocean Planning, https://www.researchgate.net/publication/341138653_Integrating_climate_change_in_ocean_planning (accessed: 7 November 2021).

¹⁴ The most recent international agreement to address climate change, the Paris Agreement, entered into force in 2016.

¹⁵ More on the process of governance in the context of climate change, see: Harris P. G., Reconceptualizing global governance [in:] Dryzek J. S., R. B. Norgaard, D. Schlosberg, *The Oxford Handbook of Climate Change and Society*, Oxford University Press, 2014, pp. 639-652.

¹⁶ D. Pyć, *Global Ocean Governance*, TransNav - The International Journal on Marine Navigation and Safety of Sea Transportation, 2016, vol. 10, No 1, p. 159, DOI: 10.12716/1001.10.01.18, https://www.researchgate.net/publication/301718455_Global_Ocean_Governance (accessed: 17 July 2022).

¹⁷ A. Zervaki, *Human security and climate change mitigation: The case of ocean governance*, Marine Policy, vol. 98, 2018, pp. 286-294, <https://doi.org/10.1016/j.marpol.2018.09.026> (accessed 17 July 2022).

Nations Convention on the Law of the Sea (UNCLOS).¹⁸ It establishes a legal regime of rules and recommended practices which can be used as a structure of government.¹⁹ UNCLOS does not regulate directly the issue of reducing greenhouse gases emissions, however there are some regulations relevant to climate change itself.²⁰ The essence of UNCLOS is implementation of its obligation to protect and preserve the marine environment and to take measures necessary to prevent, reduce and control marine pollution primarily by states.²¹

There are two main leaders of international environmental governance, namely the United States and the European Union.²² However, as Cusumano observes, after the 1992 Earth Summit in Rio, the U.S. began to display 'an increasing reluctance' to commit to binding environmental agreements.²³ Unfortunately, the 26th session of the Conference of the Parties to the UN climate convention (COP 26) in Glasgow seems to confirm the above observation.²⁴ The United States, which used to declare an ambitious aim of cutting fossil fuel emissions in half by 2030, is failing to implement legislative acts that would ensure achieving this target. On the contrary, the European Union started to strongly support the development of international environmental governance, playing a role of a global leader in securing the entry into force of the Kyoto Protocol and the Paris

¹⁸ The United Nations Convention on the Law of the Sea, Journal of Laws of the Republic of Poland 2002, No. 59, item 543.

¹⁹ Mc Dorman T.L., *Global Ocean Governance and International Adjudicative Resolution*, Ocean & Coastal Management 2000, vol. 43, p. 256.

²⁰ D. Pyć, *Global Ocean...*, pp. 159-162.

²¹ D. Pyć, *Climate change mitigation and adaptation* [in:] D. Pyć, F. Stoll, SEAPLANSPEACE General Knowledge Manual. Marine Spatial Planning instruments for sustainable marine governance, ARCHE 2021, p. 47, https://seaplanspace.ug.edu.pl/wp-content/uploads/2019/11/Seaplanspace_09.04.2021_final.pdf (accessed: 17 July 2022).

²² See: M. Buck, *The EU's representation in multilateral environmental negotiations* [in:] E. Morgera (ed.) *The External Environmental Policy of the European Union. EU and International Law Perspectives*, Cambridge University Press 2012, pp. 76-96.

²³ United Nations Framework Convention on Climate Change (UNFCCC), adopted 9 May 1992, XXVII UNTS 7. See: E. Cusumano, *Handing over Leadership: the Drivers and Future of Transatlantic Environmental Governance* [in:] Christine Bakker, Francesco Francioni (eds.), *The EU, the US and the Global Climate Governance*, Ashgate 2014, p. 247. Also: Kelemen, Daniel R., D. Vogel, *Trading Places: The Role of the United States and the European Union in International Environmental Politics*, Comparative Political Studies, 2010/43 (4) April, 427-56 and Kulovesi K., M. Cremona, *The Evolution of EU Competences in the Field of External Relations and its Impact on Environmental Governance Policies*, TransWorld Working Paper 17, March 2013.

²⁴ President Biden's climate envoy, John Kerry, declared that „It is critically important but not the last chance for action”, while not long ago he said that the summit would be the last chance to reduce greenhouse gas emissions enough to avoid the devastating consequences of climate change. Similarly, other states (China, India, Russia, Australia and Saudi Arabia) have issued either weak new plans or none at all to cut carbon emissions from fossil fuels this decade, <https://www.nytimes.com/2021/11/01/world/john-kerry-cop26.html> (accessed: 17 July 2022).

Agreement²⁵. Apart from a clearly different attitude of the main leaders towards climate change issues in the recent years, there is a common denominator for the actions brought up all over the world, namely the participation of non-governmental activists. The non-state actors, mainly the NGOs, have been involved in decision making, implementation and litigation.²⁶

In 2015, Parties to the UN climate convention agreed to cut emissions of greenhouse gases enough to prevent temperatures from rising more than 1,5 degrees Celsius compared with preindustrial levels and to review their climate targets every five years. In order to fulfill its obligations, the European Union announced in 2019 a new strategy called „The European Green Deal”.²⁷ It is a growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use. In the context of ocean protection, several elements of the strategy must be emphasized. The European Commission noticed that a sustainable ‘blue economy’ can contribute to mitigating and adapting to climate change by improving the use of marine resources.²⁸

First of all, the essential role in the clean energy transition process is to be played by renewable energy sources, including increased offshore wind production. According to the European Commission, offshore renewable energy may become a core component of Europe’s energy system by 2050. The main advantage here is the vast potential of the European Union’s seas - from the Atlantic to the Black Sea, from the North Sea and the Baltic Sea to the Mediterranean and the seas that surround the EU outermost regions and the overseas territories.²⁹ The 2030 climate target plan outlined why, and how,

²⁵ Paris Agreement (Dec. 13, 2015), in UNFCCC, COP Report No. 21, Addendum, at 21, U.N. Doc. FCCC/CP/2015/10/Add, 1 (Jan. 29, 2016) (Paris Agreement).

²⁶ A. Savaresi, *EU and US Non-State Actors and Climate Governance*, [in:] Christine Bakker, Francesco Francioni (eds.), *The EU, the US and the Global Climate Governance*, Ashgate 2014, p. 211.

²⁷ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. *The European Green Deal*, Brussels, 11.12.2019, COM (2019) 640 final. Also: Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, *Sustainable Europe Investment Plan, European Green Deal Investment Plan*, COM(2020) 21 final.

²⁸ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, *The European Green Deal*, Brussels, 11.12.2019, COM (2019) 640 final, section 2.1.7, p. 13.

²⁹ Despite being located far away from the European continent, the EU’s 9 outermost regions are an integral part of the Union: Guadeloupe, French Guiana, Martinique and Saint-Martin (Caribbean sea), Réunion and Mayotte (Indian Ocean), the Canary Islands, the Azores and Madeira (Atlantic Ocean). Communication from the Commission to the European Parliament,

greenhouse-gas emissions should be reduced by at least 55% by 2030 compared to 1990. This will require a scale up of the offshore wind industry, which is estimated to require less than 3% of the European maritime space and can therefore be compatible with the goals of the EU Biodiversity Strategy.³⁰ The EU and Member States need a long-term framework for business and investors that promotes a sound coexistence between offshore installations and other uses of the sea space, contributes to the protection of the environment and biodiversity and allows for thriving fishing communities. Every sea basin in Europe is different, and has different potential due to each specific geological conditions and the specific stage of offshore renewable energy development.³¹ Therefore different technologies suit different sea basins. Increasing offshore wind production requires cooperation between states.³²

Secondly, changes in maritime sector are taken into consideration. The revision of the Combined Transport Directive is considered in order to turn it into an effective tool to support multimodal freight operations involving rail and waterborne transport, including short-sea shipping. Also, the European Commission is going to extend European emissions trading to the maritime sector.³³ In order to make transport less polluting, access of the most polluting ships to EU ports is to be regulated and docked ships will be obliged to use shore-side electricity.³⁴

Another element of the European Green Deal strategy is food policy.³⁵ At present, food production results in air, water and soil pollution and contributes not only to climate change but to the loss of biodiversity as well. The aim of a new policy is to make European food system sustainable, fair, healthy and

the Council, the European Economic and Social Committee and the Committee of the Regions, An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future, COM (2020) 741 final, p.1

³⁰ EU Biodiversity Strategy for 2030. Bringing nature back into our lives. COM/2020/380 final.

³¹ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future, COM (2020) 741 final.

³² I. Pineda, *Challenges and Opportunities in Renewable Energy Developments*, [in:] M. Mathioulakis (ed.), *Aspects of the Energy Union. Application and Effects of European Energy Policies in SE Europe and Eastern Mediterranean*, Cham, 2021, p. 257.

³³ This will be coordinated with action at global level, notably at the International Maritime Organization.

³⁴ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, *The European Green Deal*, Brussels, 11.12.2019, COM (2019) 640 final, section 2.1.5, p. 11.

³⁵ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, *A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system*, Brussels, 20.5.2020, COM/2020/381 final.

environmentally friendly. The strategy emphasizes the role of common fisheries and common agricultural policies, which should tackle climate change, protect the environment and preserve biodiversity at the same time ensuring 'decent living' for European fishermen and their families.³⁶ In order to achieve these objectives, the Commission intends to reduce the adverse impacts that fishing can have on ecosystems, especially in sensitive areas and to support more connected and well-managed marine protected areas.³⁷ The Commission will also work with the Member States to develop the potential of sustainable seafood as a source of low-carbon food and launch a process to identify new innovative food and feed products, such as seafood based on algae.³⁸

2. MARITIME SPATIAL PLANNING

The process that has the capability of addressing the impacts of almost all human activities in marine areas and coastal zones is Maritime Spatial Planning (MSP).³⁹ No single definition exists for Maritime Spatial Planning. The most commonly used one is from the IOC-UNESCO guide, where MSP is defined as 'a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process'.⁴⁰ According to the same reference, effective MSP is ecosystem-based, integrated (across sectors, agencies and levels of government), area-based, adaptive, strategic (that is, focused on the long term), and participatory (with active involvement of stakeholders).⁴¹ MSP is an element of sea use management, to make well informed and coordinated decisions about how to use marine

³⁶ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, *The European Green Deal*, Brussels, 11.12.2019, COM (2019) 640 final, section 2.1.7, p. 12.

³⁷ *Ibidem*, p. 13.

³⁸ *Ibidem*, p. 12.

³⁹ D. Pyć, *Concept, Terminology and key issues* [in:] D. Pyć, F. Stoll, SEAPLANS-SPACE General Knowledge Manual. Marine Spatial Planning instruments for sustainable marine governance, ARCHE 2021, p. 39; D. Pyć, *The role of the Law of the Sea in Marine Spatial Planning* [in:] eds. J. Zaucha, K. Gee, *Maritime spatial planning*, Palgrave Macmillan 2019 https://link.springer.com/content/pdf/10.1007/978-3-319-98696-8_16.pdf (accessed: 7 July 2022).

⁴⁰ UNESCO definition was adopted in EU law, see: Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning, OJ L 257 z 28.8.2014, pp. 135-145.

⁴¹ Integrating climate change in ocean planning. Available from: https://www.researchgate.net/publication/341138653_Integrating_climate_change_in_ocean_planning (accessed: 7 November 2021).

resources sustainably and how to reduce conflicts between maritime space stakeholders. Moreover, it is a practical way to create and to implement a rational organization of sea/maritime space uses and to strengthen the interaction between its stakeholders.⁴²

The objective of MSP is to develop coordinated decision-making and to combine various, formal and informal, public undertakings and marine initiatives in line with commonly accepted goals, values and targets, in order to support the sustainable development of the seas and oceans. It is an integrative process conducted in order to deal with the increasing pressure from different sectors that need marine space while protecting the existing ecosystems. The outcome of this process can result in the form of principles, strategies, guidelines and concepts connected with the use of sea space. It can also take form of administrative decisions on the temporal and spatial distribution of relevant activities in the marine areas. The functional character of MSP shows a swift from traditional single sector planning to a more integrated approach to the planning of the sea.⁴³

3. LOW-LYING ISLANDS AND COASTS

Ocean changes already impact low-lying islands and coasts with cascading and compounding risks. Disproportionately higher risks are expected in the course of the 21st century. Reinforcing the findings of the IPCC Special Report on Global Warming of 1.5 degrees Celsius, vulnerable human communities, especially those in coral reef environments and polar regions, may exceed adaptation limits well before the end of this century and even in a low greenhouse gas emission pathway.⁴⁴ It is expected that greenhouse gases emissions will lead to further sea-level rise. Scientists estimate that one billion people will be affected by annual flooding by 2100, of those, 230 million occupy land within one meter of high tide lines. Most estimates place the average sea-

⁴² D. Pyć, *Concept, Terminology and key issues* [in:] D. Pyć, F. Stoll, SEAPLANS-SPACE General Knowledge Manual. Marine Spatial Planning instruments for sustainable marine governance, ARCHE 2021, pp. 39-44.

⁴³ More on the aims of MSP at: <https://www.msp-platform.eu/msp-eu/introduction-msp> (accessed: 7 November 2021).

⁴⁴ A. K. Magnan, M. Garschagen, J.-P. Gattuso, J.E. Hay, N. Hilmi, E. Holland, F. Isla, G. Kofinas, I.J. Losada, J. Petzold, B. Ratter, T. Schuur, T. Tabe, and R. van de Wal, 2019: Cross-Chapter Box 9: Integrative Cross-Chapter Box on Low-Lying Islands and Coasts. [in:] *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*, H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.). In press. p. 668.

level at 2 meters within the next century, if they are correct, then hundreds of millions of people will soon be at risk of losing their homes to the sea.⁴⁵

The effects of global warming will be most drastic for small island nations, particularly low-lying ones, like Fiji or Barbados.⁴⁶ Five islands in the Solomon Islands have been already lost due to sea-level rise and coastal erosion. This was the first scientific evidence of the effects of climate change on coastlines and people. At this time another nine reef islands are severely eroded and likely to disappear in the coming years.⁴⁷ For low-lying states such as Tuvalu and Kiribati, insufficient fresh water has been cited as the most probable trigger for rendering these countries uninhabitable in the longer term. The Republic of Marshall Islands⁴⁸ was described by a World Bank as one of the first nations whose existence would be threatened by rising sea levels. Although its constitution grants all citizens a natural and inalienable right to land, this particular right is endangered by climate change and the sea level rise that threaten low-lying lands, disrupts coastlines and change the traditional ways of life dependent on the tides and currents of the ocean. Rising sea levels sink buildings and flood urban areas situated on land between the lagoon and the ocean, so the Marshallese are already facing the negative impacts of climate change. However, there are still some adaptation options left. According to the research conducted for the World Bank, through long-term climate adaptation planning, Marshall Islands can still strengthen the urban atolls and face the risk of flooding.⁴⁹

Small island nations contribute little to climate change but they are most affected by its negative impacts such as rising sea levels and hurricanes. That is why, on October the 31st, 2021, the Prime Minister of Antigua and Barbuda – current Chair of the Alliance of Small Island States (AOSIS) – and the Prime Minister of Tuvalu signed an agreement that paves the way for climate change litigation before international courts. The Agreement constitutes a new Commission of Small

⁴⁵ S. Kulp, B. Strauss, *New Elevation Data Triple Estimates of Global Vulnerability to Sea-level Rise and Coastal Flooding*, *Nature Communications* 2019, 10, 4844.

⁴⁶ Low-lying islands and coasts host around 11% of the global population, generate about 14% of the global Gross Domestic Product and comprise many world cultural heritage sites.

⁴⁷ S. Albert, J. Leon, A. Grinham, J. Church, B. Gibbes, C. Woodroffe, *Interactions Between Sea-level Rise and Wave Exposure on Reef Island Dynamics in the Solomon Islands*, *Environmental Research Letters*, vol. 11, no. 5, 2016.

⁴⁸ Around 60,000 Marshallese live on 182 km² of land spanning an oceanic territory of 200,000 km². Alongside Kiribati and Tuvalu in the Pacific, and the Maldives in the Indian Ocean, Marshall Islands is one of our planet's four atoll nations.

⁴⁹ If sea level rise levels reach 2m or more, the only options are massive land reclamations and land raising that includes relocating part of the population. These options would cost billions of dollars and require investments far higher than current adaptation projects. Alternately, the Marshallese would be forced to rely on inter-atoll or international migration as an adaptation option. See: *Adapting to rising sea levels in Marshall Islands*, 21.10.2021, <https://www.worldbank.org/> (accessed: 7 November 2021).

Island States on Climate Change and International Law, which main task is to develop and implement fair and just international environmental principles and practices. The Commission is also authorized to request advisory opinions from the International Tribunal for the Law of the Sea (ITLOS)⁵⁰ on the legal responsibility of States for carbon emissions, marine pollution, and rising sea levels caused by climate Change. The islands hope that the Tribunal will rule on whether excessive greenhouse gases are pollutants covered under the Convention, a decision that could become precedent because it could pave the way for lawsuits before the tribunal or other international courts. As a first step, the islands would ask the tribunal judges whether it is possible to claim damages from countries emitting greenhouse gases that warm and change the oceans on grounds of the polluter pays principle.⁵¹ According to the United Nations, while developed nations had pledged more than a decade ago to mobilize \$100 billion a year by 2020 to help poorer ones cope with climate impacts, they have fallen short.⁵²

CONCLUSIONS

Climate change is the main threat to have affected the global environment in the last few decades and as such has recently become one of the most frequently discussed issues in international fora. There is no doubt that climate change is affecting oceans. Climate change impacts on ocean affect a broad spectrum of law and policy. The three main impacts of climate change on ocean are increasing ocean temperatures, changing ocean currents and ocean acidification. These impacts have broad direct and indirect implications for international security, marine biodiversity, sea-level rise and shipping.⁵³ Also, less directly,

⁵⁰ The International Tribunal for the Law of the Sea is an independent judicial body established by the 1982 United Nations Convention on the Law of the Sea. It has jurisdiction over any dispute concerning the interpretation or application of the Convention, and over all matters specifically provided for in any other agreement which confers jurisdiction on the Tribunal. Disputes relating to the Convention may concern the delimitation of maritime zones, navigation, conservation and management of the living resources of the sea, protection and preservation of the marine environment and marine scientific research, <https://www.itlos.org/en/main/latest-news/> (accessed: 7 November 2021).

⁵¹ Media Release, Office of the Prime Minister Antigua and Barbuda, <https://barbadostoday.bb/2021/10/31/antigua-and-barbuda-and-tuvalu-to-seek-justice-for-climate-change-damage-before-international-courts/>

⁵² https://unfccc.int/sites/default/files/resource/cma2021_08_adv_1.pdf (accessed: 7 November 2021).

⁵³ Susan Lozier, a physical oceanographer at College of Sciences at Georgia Tech, [in:] Heather Murphy, A Crucial System of Ocean Currents Is Faltering, Research Suggests, *The New York Times*, Aug. 5, 2021.

they affect the coastal management and development, food security, global population movement and the magnitude of climate change itself. The International Panel on Climate Change special report highlights the urgency of timely, ambitious, coordinated, and enduring action. Achieving the mitigation targets set by the Paris Agreement on climate change and limiting the global average temperature increase to below 2 degrees Celsius above pre-industrial levels is crucial to prevent the massive, irreversible impacts of ocean warming on marine ecosystems and their services.⁵⁴

The interrelationship between the ocean and climate change must be recognized, understood, and incorporated into governmental policies. Climate governance has evolved along two different paths across the Atlantic. In the European Union, the role of oceans in mitigating and adapting to climate change is increasingly recognized. The European Union has adopted a set of climate policy and law instruments, while in the United States, the climate law-making process has stalled at the federal level. These two diverging domestic pictures have resulted in different ways of involvement in the global climate regime, with the EU taking a proactive stance and the United States an increasingly, as Savaresi observes, 'inward-looking' approach. However, what they have in common is the participation of non-state actors in climate change matters. The non-state actors, mainly the NGOs, have been involved in law and policy making, standard-setting and litigation.⁵⁵ The EU's ambition is to be at the forefront of coordinating international efforts towards building a coherent financial system that supports sustainable solutions.⁵⁶ The EU legislator adopted an exhaustive list of six environmental objectives which cover climate change mitigation, climate change adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, as well as protection and restoration of biodiversity and ecosystems.⁵⁷ Europe's oceans and sea basins hold a vast potential, which can be harnessed in a sustainable and environmentally sound way, complementing other economic and social activities. The mitigation strategy on offshore renewable energy shows that a diversified approach tailored to different situations is required. Therefore, the strategy presents a general enabling

⁵⁴ The International Union for Conservation at: <https://www.iucn.org/resources/issues-briefs/ocean-warming>

⁵⁵ A. Savaresi, *EU and US Non-State Actors and Climate Governance*, [in:] Christine Bakker, Francesco Francioni (eds.), *The EU, the US and the Global Climate Governance*, Ashgate 2014, p. 211.

⁵⁶ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. *The European Green Deal*, Brussels, 11.12.2019, COM (2019) 640 final.

⁵⁷ A. Sikora, *European Green Deal – legal and financial challenges of the climate change*, ERA Forum, Springer 2020, p.13, <https://doi.org/10.1007/s12027-020-00637-3>

framework, addressing barriers and challenges common to all offshore technologies and sea basins but also sets out specific policy solutions adapted to the different state of development of technologies and regional contexts.

Climate change is a matter that may be only effectively resolved through measures that are agreed at global level and bind the whole international community and requires a multilevel system of protection. A range of response options and adaptation measures includes, apart from limiting greenhouse gas emissions, protecting and restoring marine and coastal ecosystems, improving human adaptation, building scientific research, education and awareness. For instance, establishing marine protected areas and putting in place adaptive measures, such as precautionary catch limits to prevent overfishing, can protect ocean ecosystems and shield humans from the negative effects of ocean warming.⁵⁸ Maritime Spatial Planning is a good example of how the process of ocean governance should look like. Maritime Spatial planning of marine areas is vital to balance multiple human demands and ensure a healthy and resilient ocean, while supporting global ocean goals. It should be understood as a process by which the relevant stakeholders manage activities in marine areas in order to achieve ecological, economic and social objectives. As such, marine spatial planning must effectively integrate climate change.⁵⁹

To conclude, it is not certain how global warming will change the ocean in the nearest future, however, the fact of the climate change itself is more than obvious. Climate change poses complex governance challenges. Governance in this context means dividing, coordinating and enforcing responsibilities in order to address the challenge of climate change, among various actors: international organizations, states, nations, regions, local authorities, NGOs and individuals. States remain the main actors of climate governance, however, non-state actors have been increasingly engaged in climate policy and law, both at domestic and the international level.⁶⁰ Therefore, it is a framework that embraces all mitigation and adaptation efforts. Mitigation climate change through measures to reduce greenhouse gas emissions or to enhance carbon sinks so as to avoid dangerous anthropogenic interference with the Climate System lies at the heart of the international climate regime.⁶¹ However, the absence of significant mitigation rules and the inevitability of some negative impacts of climate change is prompting increased attention to adaptation

⁵⁸ The International Union for Conservation at: <https://www.iucn.org/resources/issues-briefs/ocean-warming>

⁵⁹ <https://seaplanspace.eu/msp/> (accessed: 7 November 2021).

⁶⁰ A. Savaresi, *EU and US Non-State Actors and Climate Governance* [in:] Christine Bakker, Francesco Francioni (eds.), *The EU, the US and the Global Climate Governance*, Ashgate 2014, p. 219.

⁶¹ Art. 2 UNFCCC.

planning. Adaptation governance differs from the traditional methods of governance applied in the context of mitigation. While efforts to mitigate climate change are based on collective international action and therefore demand centralized and consensus based decision-making, adaptation takes place on national, regional and local levels and requires participation of various actor in legislation process. The main goal of ocean governance will have to be adaptation based on divergence. Different regions of the world will need different solutions. The shortage of goods, energy and the search for profit may encourage public and private operators to seek new sources of prosperity that may affect the areas of Earth that have so far remained undisturbed, such as polar regions. The question is how to achieve the effectiveness of law at every level of governance in ongoing efforts to mitigate and adapt to climate change? The example of sinking islands shows how important is adaptation to the sea-level rise. Disappearance of islands poses new questions rooted in legal rules on creation and extinction of states.⁶²

ZMIANA KLIMATU JAKO WYZWANIE W ZAKRESIE ZARZĄDZANIA OCEANEM

Słowa kluczowe: zmiana klimatu, zarządzanie oceanami, mitygacja, adaptacja, prawo klimatyczne, zarządzanie strefą przybrzeżną, prawo oceaniczne, małe wyspy

Abstrakt

Prawo oceaniczne bardzo rozwinęło się w ostatnich latach jako dziedzina prawa morskiego i prawa ochrony środowiska. Zwrócono większą uwagę głównie na podnoszenie się poziomu morza, zakwaszenie oceanów i zmieniające się prądy oceaniczne spowodowane zmianą klimatu. Negatywne skutki zmian klimatu wpływają na szerokie spektrum prawa i polityki oraz mają bezpośredni i pośredni wpływ na różne aspekty, takie jak: bezpieczeństwo międzynarodowe, bezpieczeństwo żywnościowe, żegluga, rybołówstwo, zarządzanie morskie i przybrzeżne itp. Według raportu IPCC 2018, ekosystemy oceaniczne już doświadczają zmian na dużą skalę i oczekuje się, że krytyczne progi zostaną osiągnięte przy wyższych poziomach globalnego ocieplenia. Głównym celem artykułu jest przedstawienie, w jaki sposób prawo oceaniczne i prawo klimatyczne odpowiadają na wyzwania regulacyjne spowodowane zmianami klimatu.

⁶² More on that issue, see: J. McAdam, „Disappearing States”, *Statelessness and the Boundaries of International Law*, [in:] J. McAdam (ed.) *Climate change and displacement. Multidisciplinary perspectives*, Oxford and Portland, Oregon, 2012.

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