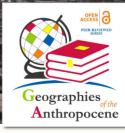
THE ANTHROPOCENE AND ISLANDS:

VULNERABILITY, ADAPTATION AND RESILIENCE TO NATURAL HAZARDS AND CLIMATE CHANGE

Miquel Grimalt Gelabert - Anton Micallef - Joan Rossello Geli Editors

> Preface by Ilan Kelman





THE ANTHROPOCENE AND ISLANDS: VULNERABILITY, ADAPTATION AND RESILIENCE TO NATURAL HAZARDS AND CLIMATE CHANGE

Miquel Grimalt Gelabert Anton Micallef Joan Rossello Geli

Editors





"The Anthropocene and islands: vulnerability, adaptation and resilience to natural hazards and climate change" Miquel Grimalt Gelabert, Anton Micallef, Joan Rossello Geli (Eds.)

is a collective and multilingual volume of the Open Access and peerreviewed series "Geographies of the Anthropocene" (Il Sileno Edizioni), ISSN 2611-3171.

www.ilsileno.it/geographiesoftheanthropocene



Cover: imaginary representation of a tsunami that impacted an island. Source: pixabay.com

Copyright © 2020 by Il Sileno Edizioni Scientific and Cultural Association "Il Sileno", VAT 03716380781 Via Piave, 3A, 87035 - Lago (CS), Italy.

This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 Italy License.



The work, including all its parts, is protected by copyright law. The user at the time of downloading the work accepts all the conditions of the license to use the work, provided and communicated on the website http://creativecommons.org/licenses/by-nc-nd/3.0/it/legalcode

ISBN 979-12-800640-2-8

Vol. 3, No. 2, November 2020





Geographies of the Anthropocene

Open Access and Peer-Reviewed series

Editor-In-Chief: Francesco De Pascale (CNR – Research Institute for Geo-Hydrological Protection, Italy).

Associate Editors: Fausto Marincioni (Department of Life and Environmental Sciences, Università Politecnica delle Marche, Italy), Francesco Muto (Department of Biology, Ecology and Earth Sciences, University of Calabria, Italy), Charles Travis (Department of History, University of Texas, Arlington, USA; Trinity Centre for the Environmental Humanities, Trinity College Dublin, Ireland).

Editorial Board: Mohamed Abioui (Ibn Zohr University, Morocco), Andrea Cerase ("Sapienza" University of Rome, Italy), Valeria Dattilo (University of Calabria, Italy), Dante Di Matteo (Polytechnic University of Milan, Italy); Jonathan Gómez Cantero (Departamento de Meteorología de Castilla-La Mancha Media, Spain), Davide Mastroianni (University of Siena, Italy), Giovanni Messina (University of Palermo, Italy), Joan Rossello Geli (Universitat Oberta de Catalunya, Spain), Gaetano Sabato (University of Catania, Italy), Carmine Vacca (University of Calabria, Italy).

International Scientific Board: Marie-Theres Albert (UNESCO Chair in Heritage Studies, University of Cottbus-Senftenberg, Germany), David Alexander (University College London, England), Loredana Antronico (Italian National Research Council – Research Institute for Geo-Hydrological Protection, Italy), Lina Maria Calandra (University of L'Aquila, Italy), Salvatore Cannizzaro (University of Catania, Italy), Fabio Carnelli (EURAC Research, Bolzano; Polytechnic University of Milan, Italy), Carlo Colloca (University of Catania, Italy), Gian Luigi Corinto (University of Macerata,

Italy), Roberto Coscarelli (Italian National Research Council - Research Institute for Geo-Hydrological Protection, Italy), Girolamo Cusimano (University of Palermo, Italy), Bharat Dahiya (Director, Research Center for Integrated Sustainable Development, College of Interdisciplinary Studies Bangkok, Thailand). Sebastiano D'Amico Thammasat University. (University of Malta, Malta), Armida de La Garza (University College Cork, Ireland), Elena Dell'Agnese (University of Milano-Bicocca, Italy), Piero Farabollini (University of Camerino, Italy), Massimiliano Fazzini (University of Camerino; University of Ferrara, Italy; Chair of the "Climate Risk" Area of the Italian Society of Environmental Geology), Giuseppe Forino (University of East Anglia, England), Virginia García Acosta (Centro de Investigaciones y Estudios Superiores en Antropología Social, CIESAS, México), Cristiano Giorda (University of Turin, Italy), Giovanni Gugg (LESC, Laboratoire d'Ethnologie et de Sociologie Comparative, CNRS -Université Paris-Nanterre, France), Luca Jourdan (University of Bologna, Italy), Francesca Romana Lugeri (ISPRA, Department of Geological Survey, Italy), Fausto Marincioni (Marche Polytechnic University, Italy), Cary J. Mock (University of South Carolina, U.S.A.; Member of IGU Commission on Hazard and Risk), Gilberto Pambianchi (University of Camerino, Italy; President of the Italian Association of Physical Geography and Geomorphology), Silvia Peppoloni (Istituto Nazionale di Geofisica e Vulcanologia, Italy; Secretary General of IAPG; Councillor of IUGS), Isabel Maria Cogumbreiro Estrela Rego (University of the Azores, Portugal), Andrea Riggio (University of Cassino and Southern Lazio, Italy; President of the Association of Italian Geographers), Vito Teti (University of Calabria, Italy), Bruno Vecchio (University of Florence, Italy), Masumi Zaiki (Seikei University, Japan; Secretary of IGU Commission on Hazard and Risk).

Editorial Assistants, Graphic Project and Layout Design: Ambra Benvenuto, Franco A. Bilotta;

Website: www.ilsileno.it/geographiesoftheanthropocene;

The book series "Geographies of the Anthropocene", edited by the international scientific publisher "Il Sileno Edizioni", will discuss the new processes of the Anthropocene epoch through the various worldviews of geoscientists and humanists, intersecting disciplines of Geosciences, Geography, Geoethics, Philosophy, Socio-Anthropology, Sociology of Environment and Territory, Psychology, Economics, Environmental Humanities and cognate disciplines.

Geoethics focuses on how scientists (natural and social), arts and humanities scholars working in tandem can become more aware of their ethical responsibilities to guide society on matters related to public safety in the face of natural hazards, sustainable use of resources, climate change and protection of the environment. Furthermore, the integrated and multiple perspectives of the Environmental Humanities, can help to more fully understand the cultures of, and the cultures which frame the Anthropocene. Indeed, the focus of Geoethics and Environmental Humanities research, that is, the analysis of the way humans think and act for the purpose of advising and suggesting appropriate behaviors where human activities interact with the geosphere, is dialectically linked to the complex concept of Anthropocene.

The book series "Geographies of the Anthropocene" publishes online volumes, both collective volumes and monographs, which are set in the perspective of providing reflections, work materials and experimentation in the fields of research and education about the new geographies of the Anthropocene.

"Geographies of the Anthropocene" encourages proposals that address one or more themes, including case studies, but welcome all volumes related to the interdisciplinary context of the Anthropocene. Published volumes are subject to a review process (**double-blind peer review**) to ensure their scientific rigor.

The volume proposals can be presented in English, Italian, French or Spanish.

The choice of digital Open Access format is coherent with the flexible structure of the series, in order to facilitate the direct accessibility and usability by both authors and readers.

CONTENTS

Preface	8
Introduction (English, Spanish and Italian languages)	11

Section I

Natural hazards, volcanism, earthquakes and societal impacts

1.	Riflessioni sul rischio vulcanico nei paesaggi lavici antropizzati regione dell'Etna	della
	Salvatore Cannizzaro, Antonio Danese, Riccardo Privitera	21
2.	Large island, big issues. Vulnerability and resilience in Sardinia Andrea Corsale, Carlo Perelli, Giovanni Sistu	59
3.	When the giant shakes. Anthropology of the seismicity of Ischia island-volcano in the Mediterranean Sea <i>Giovanni Gugg</i>	, an 78
4		1 1.

4. Le politiche di contrasto al rischio da maremoto: il caso di Stromboli *Giovanni Messina* 101

Section II

Climate and Global Change, vulnerability, water resources and sustainability

- Climate relocation of Indigenous peoples from island territories: Issues related to the misunderstanding of their indigenousness Adèle de Mesnard
 122
- Impacts of climate change on the evolution of water resources in the context of the Mediterranean islands using as an example two Aegean Sea islands: consequences for touristic activities in the future Christian Depraetere, Konstantinos X. Soulis, Demetrios E. Tsesmelis, Georgios Avgoustidis, Ioannis Spilanis 143

7.	Caractérisation des ressources en eau et de leurs facteurs de dégradation dans l'île de Carabane	
	Cheikh Faye, Antoine Demba Manga	183
8.	Les îlots du Sahel (Tunisie orientale) : variété, géoarchéologique et risques	intérêt
	Ameur Oueslati	203
The A	uthors	238

5. Climate relocation of Indigenous peoples from island territories: issues related to the misunderstanding of their indigenousness

Adèle de Mesnard¹

Abstract

While climate relocation is gaining recognition as an adaptation strategy in the international climate regime, specificities of Indigenous peoples' relocation requires analysis of the varying contexts in which it takes places. It is not just a question of understanding climate change impacts on island Indigenous territories: a functional strategic planning can only be achieved by understanding local dynamics and the asymmetrical relationship that communities have with their national governments. Including Indigenous claims is equally important. The example of Native communities living on barrier islands in Alaska shows that community members claim to remain a community and a cultural distinct entity – the importance of choosing where they move being an essential factor – and to freely decide their future. They refuse to allow their vulnerability to climate change to be used only as pretext to deny them any possibility of adaptation. A brief analysis of legal and institutional obstacles to the recognition of their indigenousness in displacement then makes it possible to see how Native communities' climate relocation should be planned and implemented. The objective is to go beyond a static approach to Indigenous rights and identities, while considering the specificity of a collective approach. It also allows us to analyze how their demands are concretized on the national and international scene. While the Indigenous peoples do not remain passive, international organizations and NGOs are not passive either, at least not if we consider the relatively large number of instruments adopted in recent years to guide States' action. However, the main challenge remains to effectively integrate Indigenous specificities into the broader framework of climate relocation.

¹ *Corresponding Author*. PhD in Law. Lecturer at the University of Lyon 3. Institut de Droit de l'Environnement (CNRS, UMR 5600, EVS-IDE) 18 rue Chevreul, 69007 Lyon – France. E-mail : adele.de-mesnard@orange.fr.

Keywords: Indigenous peoples, climate change, climate relocation, adaptation, self-determination.

Introduction

While the impacts of climate change became visible in a variety of ways, what is most striking is the risk of seeing small island territories sink. Over the years, they have become the symbol of what could be the most dramatic consequences of climate change worldwide, even though greenhouse gas emissions from these island territories remain negligible. Beyond the hardhitting nature of the press headlines, the Intergovernmental Panel on Climate Change (IPCC) continues to warn on the effects of sea-level rise and extreme weather events. In its special report "Global warning of 1.5°C" (2018), IPCC draws attention to the consequences of sea level rise on small islands, lowlying coastal areas and deltas. IPCC also informs decision-makers and the public about the risks to Indigenous peoples and local communities dependent on agricultural or livelihoods who live within these territories. In its Synthesis Report of 2014, it states that "climate change is projected to increase displacement of people (medium evidence, high agreement). Displacement risk increases when populations that lack the resources for planned migration experience higher exposure to extreme weather events, such as floods and droughts [...] Changes in migration patterns can be responses to both extreme weather events and longer-term climate variability and change, and migration can also be an effective adaptation strategy". By opposition to migration as a possible climate change adaptation strategy, displacement looks disordered since it would occur when populations have no sufficient resources to migrate. This distinction is in line with the one made by international organizations between forced and voluntary movement although this can and should be discussed because of legal and political issues and of the practical and symbolic implications. Regardless of the difficulty to conceptualize environmental-induced movements, the trap to be avoided is considering that the realities of concerned individuals and groups are static, which could lead to giving them a legal status that is out of step with their expectations and needs. Such representations from outside the communities may entrench them in an inadequate legal regime, and tensions that may result can be exacerbated by existing asymmetries in their relations with public authorities. Following the Cancun Agreements in 2010, IPCC analyses, in its last Special Report "on the Ocean and Cryosphere in a Changing Climate" (2019), the third type of human mobility, i.e., planned relocation, as an

adaptation strategy. As defined by the expert meeting of San Remo (2014) with the United Nations High Commissioner for Refugees (UNHCR), planned relocation is a "solution-oriented measure involving the State, in which a community ... is physically moved to another location and resettled *there*". Stressing that this process must be anticipated, a distinction is made with "evacuation" as moving quickly to a safer place after an emergency. This definition of planned relocation addresses two major issues: it is supposed to be a government-led measure and it concerns a collective and communitybased displacement. It is worth noting that IPCC equates the term "planned relocation" with the term "managed retreat", which clearly shows that such an issue is more suitable for island territories and must be considered through the prism of coastal management strategy. In analyzing the relevance of planned relocation for low-lying areas exposed to the impacts of coastal hazards, IPCC is relatively critical, particularly in the case where "relocation of people displaces pressure to destination areas with a potential increase of risk for the latter". It pleads for an "ambitious adaptation" (without really defining what is meant by that), which should make it possible to develop "a robust foundation for adaptation beyond 2100" but without "necessarily eradicate end-century risk from seal-level rise across all low-lying coastal areas" (IPCC, 2019). Besides, IPCC remarks that its analysis is limited in that it only considers technical aspects, without consideration of the financial and social aspects. However, they are decisive, particularly in respect to the very particular situation of Indigenous communities. Indeed, public authorities need to understand that climate relocation of Indigenous peoples is not just about moving them from point A to point B, eventually to wherever it would be possible to send them.

Not only Indigenous peoples' special relationship to the land is an essential factor, but the notion of collective and the legal treatment of the 'community' must also be integrated into the relocation process. The idea of community cannot be the mere addition of individuals acting in common to achieve their individual goals but must address the fact that individuals intend to move as a group. Therefore, the following question raises: how to recognize the community as a legal distinct entity without changing its nature or undermining its cultural integrity and its ability to function according its own norms and institutions? This issue is particularly important in cases of relocation of island Indigenous peoples as their claims relate, on the one hand, to territorial continuity between the island and the mainland (which also underlies the issue of the island lands left behind) and on the other hand, to their desire to continue to develop as culturally distinct entities – the case of

barrier islands favoring the expression of a "*unified island identity*" (Grydehøj, Nadarajah, Markussen, 2018).

1. The indifference on indigenousness: lessons from failures of Alaskan Native communities' climate relocation

This research is based on the observation that Indigenous peoples face a number of legal and institutional obstacles when deciding to relocate because of climate change. There is no binding legal framework regulating their relocation and integrating Indigenous specificities on which they could invoke to challenge the actions or omissions of the State. A fortiori, taking the example of internal climate-driven displacement of Native communities in Alaska, no national legislation stipulates specific treatment. When we look at the situation of two communities, Kivalina and Shishmaref, they initiated their relocation more than thirty years ago, without getting any reaction from the US government until the early 2000s when climate change-related impacts and the need for permanent relocation became indisputable. They are two Inupiat communities, each residing on a barrier island in the Chukchi Sea. that are subject to increased erosion pressures. A UNESCO report (2010) mentions that in Shishmaref, more than half of land (producing 80% of the resources) has disappeared into the sea, while in Kivalina, the area of the island has decreased by 50% between 1953 and 2009. As confirmed by IPCC's special report "on the Ocean", islands are also threatened by extreme climatic events, particularly storms and subsequent flooding. In the past, the coastline was protected by the formation of sea ice, which absorbed the mechanical energy of waves. Ice now appears much later in the year and melts early, leaving the coasts more exposed to erosion and wind-driven storm surges. Waves are higher and therefore potentially more destructive of the shoreline, whose erosion allows waves to reach the village's infrastructure.

Nonetheless, climate causes should not be examined separately, but by considering the historical process of how the government has understood Indigenous specificity. Indeed, at the beginning of the 20th century, government policies of forced sedentarization to civilize and assimilate Native families into American society coerced them to settle permanently in villages created from scratch on ecologically precarious places. These chosen places were located on very small islands, practically at sea level and previously used as seasonal hunting and fishing summer camps. They were selected without the consent of Indigenous peoples and without understanding that the Indigenous political and socio-cultural system is based

on a seasonal cycle allowing to respond to the changes in ecological and meteorological conditions (Marino, 2015). Forced sedentarization on barrier islands thus also reflects the desire of the American government to contain the claims of indigenousness in a more restricted space. About the relocation process itself, public authorities did not support their choice of relocation sites, which stopped the process from moving forward. Communities claimed - and they still do - that they wanted to choose an unoccupied land they could collectively own. This place must be close to their current lands and have similar characteristic so they can maintain their identity, livelihood and way of life in their own way. They refuse to move within an existing community and to an urban area, because it could only lead to community dislocation and loss of territorial ties (Marino, Lazrus, 2015). They want to remain a community and culturally distinct entities - the islander identity being therefore mobilized in the frame of "both self-identification and identification by others as deserving of rights accorded to originary inhabitants of a territory" (Grydehøj, Nadarajah, Markussen, 2018).

However, these claims are facing government requirements. In Kivalina, the U.S Army Corps of Engineers' analysis of the suitability of any new location is based primarily on geotechnical considerations, dismissing any criteria that cannot be technically or economically quantified, which excludes the special relationship that Native communities have with their lands and with their environment. Primarily based on land physical properties and on the vulnerability of the infrastructure to flooding and coastal erosion, its analysis leads it to select places much further away than those chosen by Kivalina (USACE, 2006). Considering their difficulties to maintain their relationship with the ocean and to continue their subsistence activities (Shearer, 2011; 2012), communities cannot accept it. Not to address cultural or socio-political issues and to reformulate them only in technical terms can significantly reduce the ability of Indigenous communities to adapt to a new environment. Technical engineering put communities in a passive position by excluding them from the decision-making process since experts will always know better than they do what should be done to reduce climate contingencies impacts (Thornton & Manasfi, 2010; Alexander & al, 2012). This paternalism - perhaps unintentional- is exacerbated by misrepresentations of Indigenous peoples: they are not supposed to be able to understand technical solutions (Cameron, 2012; Whyte, 2017).

Another major problem is that no federal authority has the mandate and financial capacity to coordinate alone the relocation (US G.A.O, 2003; 2009). The lack of a leading entity to force federal and state agencies to work together implies a dispersal of responsibilities and a scattering of assistance

programs, combined with the difficulties for communities to be eligible for such programs. Each agency prefers to act alone so as not to risk being responsible for the entire relocation process, especially since funds lack to do so. This leads to incompatible action patterns, but also to contradictions in considering Indigenous specificities and in understanding Indigenous rights. Besides, what is called by communities as "battle fatigue" (Gray Glenn & Associates, 2010) is then amplified by the multiplicity of stakeholders they must deal with. Every time, the new generation must then rediscover the imbroglio of standards, reports and funding arrangements and the workings of the multiple federal and state agencies to regain leadership and re-establish dialogue. Shearer (2012) calls it "administrative orbit". This implies significant expertise for the communities since they must adapt their demand to each agency's objective and untenable conditions. Indeed, agencies tend to focus on a cost/benefit analysis (FEMA, no date). However, due to the high transportation costs associated with construction or communities' geographical location, Native communities' projects have a low benefit-cost ratio. The profitability-based approach exacerbates public agencies' misunderstanding of communities' social and cultural systems; agencies' projects imply a complete change in communities' way of life, without them having any real say in how they want these changes to occur.

Finally, in addition to the lack of centralized State financing, any progress is hampered by public authorities' decoupling measures to mitigate climate change's impacts *in situ* and the relocation process (Marino, 2012). When the US government is informed of the willingness of communities to relocate, it cuts climate change funding, without reallocating the funds to the relocation process. This situation let the communities hit a dead end, especially since the government does not understand that relocation takes time. This implies that, while a new village is being built, the old village will continue to be inhabited during this transition period although exposed to climate change and requires to be protected. However, Native communities do not remain passive when faced with the lack of political will on the part of the government to consider their specificities and to recognize their rights. They are mobilized to steer the debate in such a way that it is not rooted in a legal and institutional framework that they would consider inappropriate.

2. The Indigenous initiatives: to put their right to decide freely of their future back at the heart of the debate

At the national level, the example of Newtok is particularly interesting since it demonstrates the possibility of governance that would take place to effectively implement Indigenous peoples' self-determination right. Newtok, a Yupik community, is located on the bend of the Ninglick River, north of Nelson Island, about 150 kilometers from Bethel. In 1994, the Newtok Traditional Council formally began the relocation process. In 1996, after preselecting six potential relocation sites, community members collectively chose to relocate to Nelson Island on a site about 15 kilometers southwest of Newtok called Mertarvik. After seven years of negotiations, in 2003, Newtok obtained a land title through a land exchange agreement negotiated with the US Fish and Wildlife Service (Beck Consulting, 2012). The community was then able to start the construction of the new village, not yet completed because of the financial problems mentioned above. However, owning land was a catalyst for the formation of the Newtok Planning Group in 2006, with the assistance of the Alaska Department of Community and Regional Affairs (Bronen, 2014). Comprised of approximately 25 representatives from tribal, state and federal governments and non-governmental organizations, the Newtok Planning Group conducts the relocation efforts. The Newtok community has thus succeeded to establish collaborative governance by meeting stakeholders to convince them to participate in the same partnership. This makes it possible to fill the institutional gaps, and particularly to significantly reduce the delays caused by public agencies' responsibility spreading. It also allows the community to make its expectations and needs be heard. The relocation process is based on guiding principles defined by community's members as best suits their commitment to continue their community way of life, such as "to remain a distinct, unique community our own community", "to stay focused on our vision by taking small steps forward each day"; to "make decisions openly and as a community and look to elders for guidance"; "our voice comes first – we have first and final say in making decisions and defining priorities", "development should reflect our cultural traditions", etc. (Bronen, 2014). While Newtok Planning Group is a unique example in Alaska, this kind of collaboration seems to be the most viable way to conduct the climate relocation process. It is fully in line with developments in international law, particularly with the United Nations Declaration on the Rights of Indigenous Peoples (2007). The Declaration enshrines Indigenous people's right to self-determination (article 3) while recognizing the need to protect dynamic Indigenous culture. It also underlines

the historical injustices suffered by Indigenous peoples, "thus preventing them from exercising, in particular, their right to development in accordance with their own needs and interests" (§ 6 of the preamble). Climate relocation must not be a pretext for States to reproduce these injustices or to challenge their Indigenous character, arguing that it would make Indigenous peoples lose their authenticity, even though the latter is imposed by States. The effective exercise of the right to self-determination should not only reflect their right to freely decide where, when and how to relocate, but also imply the right to relocate as a community and a cultural distinct entity. While Indigenous communities must retain their decision-making power, it calls for a transformation of the relationship between them and national governments so that the latter, acting as 'trustees', do so genuinely in the interest of Indigenous communities.

At the international level, this has been particularly recalled by island Indigenous peoples on many occasions. In October 2018, a Convening of more than sixty representatives of island Indigenous communities from around the world was organized in Alaska to identify the problems they face when they must relocate because of climate change. A First Peoples' and Indigenous' Peoples Declaration (FIPD) was adopted. This Declaration echoes the Anchorage Declaration which was adopted on 24 April 2009 following the Indigenous Peoples' Global Summit on Climate Change held from 20 to 24 April 2009 in Alaska. At that time, not only Indigenous peoples were seeking recognition of their fundamental rights as affirmed in the United Nations Declaration on the Rights of Indigenous Peoples, particularly within the United Nations Framework Convention on Climate Change's (UNFCCC) agreements and principles, but they also issued "calls for action". Beyond climate change's impacts, they reaffirmed the need to ensure their full and effective participation in all decisions and activities related to climate change mitigation and adaptation through creating formal mechanisms in UNFCCC's decision-making bodies. The importance of Indigenous knowledge and practices in dealing with the climate change crisis also needed to be recognized. One of the calls concerns the significant reduction of greenhouse gas emissions, particularly from developed countries as stated in Annex I of the UNFCCC. In parallel with States working towards decreasing dependency on fossil fuels, they argue that they must take the control to ensure energy security and sovereignty. It should be noted that the notion of sovereignty is at the heart of the Anchorage Declaration. Indigenous sovereignty is debated in relation to the place of Indigenous peoples within the society as they are under the authority of the State. While they are nations with inherent rights,

the use of this notion is quite interesting. Associated with the notion of energy or food sovereignty, it deals more broadly with their struggle for autonomy and self-determination: the realization of one would be dependent on the realization of the other and vice-versa. Besides, Indigenous sovereignty is not intended to supplant that of the State but should ensure effective control over old or newly owned land. They indigenize the concept of sovereignty as the Anchorage Declaration also emphasizes Indigenous responsibilities and relationships with the lands, air, waters, oceans, forests, thus expressing their cultural and spiritual ties to their environment and the non-human world. Without falling into the trap of an essentialist vision, perpetuation of their way of life can only be achieved if they can freely decide their future. In this way, the issue of Indigenous climate displacement is firmly addressed (Call for action n°11).

In comparison, almost a decade later, and faced with the worsening of their situation, island communities are focusing on how their relocation should be planned and implemented, and thus how their right to mobility should be realized. However, the FIPD still focuses on the international climate regime, particularly on the implementation of the Paris Agreement, calling for the recognition of the rights of climate-displaced peoples. This is interesting insofar as the Paris Agreement appears to fall far short of their claims. The rights of Indigenous peoples are only mentioned in the Preamble by referring to "migrants" but not to climate-displaced Indigenous peoples as such. Although we might wonder if the international scene is the most effective arena for enforcing Indigenous rights, clearly there is a window of opportunity to compel world leaders for addressing Indigenous issues, supporting interaction and movement with the spaces in which Indigenous claims will actually take place. This political dynamic, tied to the creation of a unified Indigenous voice on a common issue, may influence the development of common norms and standards that can then influence local struggles, while rebalancing political, social, and cultural relations within international institutions. Thus, if the Declaration is organized into several calls, for States parties to the UNFCCC, for State Governments, for Indigenous leaders, etc., these calls would reinforce each other. In addition to respecting Indigenous rights and empowering communities, these parallels in these claims focus on community participation, in a proactive approach, in "formulating, implementing, and monitoring mitigation and adaptation activities relating to the impacts of the climate crisis" and in developing "human rights-centered laws, policies, and strategies that address the spectrum of risks associated with forcible displacement". Sharing experiences is also emphasized, by integrating "both traditional and modern" Indigenous

knowledge into an international framework (which therefore calls for revaluing this knowledge as required in the Paris Agreement) as well as within the communities themselves. To conclude on Indigenous initiatives, we can mention the complaint called "Rights of Indigenous people in addressing climate-forced displacement", filed by five Indigenous island tribes in the United States, including Kivalina, in January 2020 and submitted to UN Special Rapporteurs. The complaint is based on the wrongful inaction of the United States Government, claiming its liability for the violation of fundamental rights as applied to their specific situation – such as the right to life –, and for Indigenous rights as recognized in international law, quite particularly the right of self-determination. The complaint also insists on the need to protect their cultural heritage, particularly with the question of what will happen to the land that will be left, their legal status, and the risk of irretrievably losing the connections with their ancestors. It ties up with the International Union for the Conservation of nature's policy (IUCN, 2012).

3. The international guidance: towards a progressive recognition of Indigenous specificities in climate relocation

Based upon the inadequacy of international law to effectively protect environmentally displaced persons, the approach taken by international organizations and non-governmental organization is pragmatic, i.e, providing States with tools to better understand the displacement and relocation of their populations. Drawing lessons from failures of previous climate relocations, or even referring to the lessons of forced displacement caused by development projects, these guidance or toolkits identified principles and "good practices" that States must integrate and adapt into their national legislation. The aim is to provide a coordinated approach between States, and between the administrations, individuals as well as communities, which leads us to clarify some points concerning the definition of climate relocation as an adaptation measure.

Climate relocation differs from other population movements in that it is considered as a last resort measure against the degradation of ecosystems and habitable environment. Unlike displacement caused by development projects, it can be voluntary in the sense that it is initiated by communities (albeit under the constraint of climate change). Besides, as relocation cannot only be considered as a logistical problem, each process must be related to the multidimensional contexts in which climate change occur and include a number of factors specific to each Indigenous community: its geographic location, livelihood, relationships among its members and with the government, sharing and mutual support networks, customary rules, the range of tools and resources available to respond to hazards, etc. Two interrelated consequences can be drawn. First, it involves different perspectives, policies and tools depending on the context. For instance, while in its last report on Ocean IPCC takes into consideration the case of small Pacific Island States and the situation of Native island communities in Alaska, their realities are different not only in terms of displacements' spatiality and temporality, but also with regard to material and legal implications. In the case of Pacific Island States, it is the very existence of the State that is threatened: some States consider owning territories that belong to other States, or they have concluded bilateral agreements with neighboring States to create some special migration programs to provide Indigenous people with job opportunities. In this case, relocating is thought within an existing community. In contrast, only a small fraction of the land area of the whole State of Alaska is under threat of sinking but this one happens precisely where Indigenous communities live. This emphasizes the very situation of internally displaced communities for whom the main difficulty is much more about how relocation is planned and implemented, particularly concerning the unequal balance of power between Indigenous communities and the host State. Moreover, communities' members are at the same time US citizens and Indigenous. Thus, the Guidance for protecting people from disasters and environmental changes through planned relocations (United Nations High Commissioner for Refugees, Georgetown University and Brookings Institution, 2015) focusing only on internal relocations points out that "States bear the primary responsibility under international law to respect, protect, and fulfill the human rights of people within their territory or subject to their jurisdiction". It should be noted that in line with the Guiding principles on internal displacement, it adds that "these responsibilities may require planned relocation in order to protect persons or groups of persons". This obligation raises the question of the arbitrariness of displacement. The identification of exceptional circumstances that require States to compel persons or groups to protect them from themselves may be relatively easy in the context of natural disasters or pandemic whose sudden and often unpredictable nature requires an immediate response to preserve human lives. This is much less the case in the context of climate change. For instance, for Alaskan Native communities, the degradation of their island territory was proven a long time ago. However, the communities continue to live there, despite the highly degraded living conditions. The risk could be that environmental emergencies could be exploited by public authorities to legitimize actions that do not accommodate communities' claims. Secondly, while this does not preclude looking for common legal and political references, it implies that a solution may be an effective adaptation initiative in one territory but not in another one: there is no optimal solution in absolute terms. The same is true within a community itself because of the repercussions of every decision made and the changing contexts. Adaptation must be considered as a dynamic, continuous, and evolving process, especially since the problem of how to deal with climate change impacts is also evolving (Magnan, 2009).

Moreover, a contextual analysis highlights adaptation and then justifies the communities' involvement to understand how they are affected by climate change differently and to better understand the solutions to be provided. It avoids simplistic or essentialist visions of island communities, particularly regarding the "rhetoric of vulnerability" (Walshe, Stancioff, 2018). The problem lies in the instrumentalization of the notion of vulnerability when vulnerability is considered as an innate characteristic of Indigenous peoples, or that it is reduced solely to risk exposure, associated with the geographical isolation of the islands. Both cases lead to a biased view of insularity and indigenousness, since the factors specific to each community and the socioeconomic, political, and cultural processes are excluded from the analysis (Gemenne, 2010). This includes the historical and contemporary contexts of indigenous oppression, territorial deprivation, and denial of their rights. The problem is also the marginalization of their claims, particularly for selfdetermination. Conversely, addressing all the root causes of climate change and relocation leads to consider that all Indigenous communities are not equal by respect to climate risks and to consider the multiple specificities of their living environment. The example of island communities in the Pacific is particularly striking in this regard. For instance, several on-site surveys carried out in Tuvalu as part of the EACH-FOR program have shown that, contrary to Western representations that portray Tuvaluans as helpless and passive victims of climate change, Tuvaluans focus on the obligation for the most polluting countries to reduce their greenhouse gas emissions. Moreover, Tuvaluans' perception of the links between climate change and relocation are not unequivocal. Some Tuvaluans do not plan to relocate in the close future because of their deep attachment to their land and environment and their strong wish to preserve their right to self-determination (Farbotko & al., 2018). At the same time, for some others, mobility is seen as an adaptation strategy among others, bearing in mind that Tuvalu's history is strongly marked by inter-island displacement. The ocean is considered as an element that connects communities: people move to respond to environmental disruptions, to find a job, to care for themselves, to participate in the governance of the region's resources, etc. (Farbotko, Lazrus, 2012). While these relationships are embedded in political and socio-cultural contexts of Pacific Islands, they are not taken into account by those outside the communities, who focus on the insularity of the islands perceived as a juxtaposition of individualized and discontinuous spaces (Chevalier, 2017). Thus, these representations do not consider that relocation is not necessarily perceived by Indigenous populations of Tuvalu as affecting their fundamental rights, unlike the way it can be implemented by public authorities, with the subsequent risk to lose their right to freely decide about their future.

It should be noted that, since its latest report (2014), IPCC includes the notion of "maladaptation" to refer to adaptation processes that undermine the social and cultural balances of the populations concerned. Maladaptation then "arises not only from inadvertent badly planned adaptation actions, but also from deliberate decisions where wider considerations place greater emphasis on short-term outcomes ahead of longer-term threats, or that discount, or fail to consider, the full range of interactions arising from the planned actions" (IPCC, 2014, 837). It is therefore important, not only to think solutions in a concerted manner so as not to accentuate existing problems but also to integrate communities' needs and expectations – bearing in mind that it is sometimes difficult to achieve consensus within the community itself. Relocation should then be undertaken with a much broader perspective than just an economic one, considering that relocation projects go far beyond the mere material loss of land.

On the one hand, the Office of the UN High Commissioner for Refugees, the International Organization for Migration and Georgetown University, when designing a Toolbox to complement the 2015 Guidance, focus on five cross-cutting elements: understanding complexities related to land issues, addressing the needs and impacts of planned relocation of affected populations and ensuring their participation. They stress that the involvement of populations must be understood as a "continuum—from passive receipt of information from authorities, to the two-way process of consultation, to enabling the active participation of affected populations in decision-making (2017, 20). What matters is the quality of the consultation process: it must not be undertaken only to show that consultation has taken place, Indigenous members being only passive witnesses in the decision-making process, without deliberative capacity. Additional precautions must then be taken at the beginning of the process to ensure that an agreement is reached between community members and public authorities on how information is obtained and communicated and on how the planning phase should be organized - with the need for time for reflection within the community itself. In a pragmatic

way, moving beyond vertical and asymmetrical relations between public authorities and Indigenous peoples can facilitate their support to government's decisions as they would be the result of a collective reflection. It can also help to overcome blockages that may arise during the relocation process, as long as any opposition can be clearly expressed and debated without being seen as a breakdown in the decision-making process.

On the other hand, compensation for Indigenous peoples' land losses caused by climate relocation calls for moving beyond the cost-benefit approach. This one is often adopted in the case of expropriation of populations in the context of their relocation due to development projects. A "fair market value" approach does not adequately address Indigenous peoples' collective customary land rights. Reasoning in terms of "fair market value" leads to focusing on individual interests and therefore asking each member of the community if they are willing to relocate and at what cost, neglecting collective interest. While it could imply an improvement in living conditions for some individuals, it could profoundly affect the cohesion of the community. Besides, in addition to the recognition of Indigenous title deeds to the land so that their right to compensation cannot be contested, Indigenous peoples should be granted an equivalent land in quality, size, and value. A distinction must be made between the market value of land ownership and its replacement value, particularly when the land market is weak or non-existent because of the risks affecting land ownership, especially environmental degradation associated with the impacts of climate change. This replacement should not only be assessed in material terms: intangible cultural and spiritual values must be integrated, which implies that a "fair market value" cannot exist since these values are precisely non-market values. Insularity thus raises the question of the integration of these intangible values with even more acuity as the risk is that of the disappearance, in the physical sense, of small island territories by submersion.

Besides, all risks that are difficult to quantify, such as cultural, spiritual, and psychological disturbances, related to the loss of the land of origin (at both individual and collective levels) or to the social disruption, should be included in reparation policies. It should be noted that compensation is not enough. It may be insufficient to reestablish Indigenous communities after relocation, especially since it may overlook the temporal dimension of relocation while accelerating the process is costly. Thus, while they cannot replace a legal and institutional framework, investment policies can enable displaced communities to improve their living conditions once the relocation process is complete. They may ensure that changes are made under the best possible conditions, whether this involves retraining for Indigenous individuals, cultural diversification on the new land to increase the individual of community income, a new social or cultural balance, etc. (Cernea, 2003; Cernea and Kanbur, 2002). A return to the initial state, which is not feasible in practice, would make little sense considering the highly degraded living conditions of most Indigenous communities. Besides, such investments can establish the basis for their right to self-determination.

In conclusion, there is no doubt that understanding the complex nature of a relocation process requires a more comprehensive approach well beyond an economic and operational perspective. The challenge, for the principles adopted by international organizations, however, remains the inclusion of Indigenous peoples as such. In a highly interesting way, the Guidance highlights the need to build on a rights-based framework within which "the rights to self-determination, preservation of identity and culture, and control of land and resources are important, particularly for Indigenous communities" (2015, 11). Addressing the issue of specific needs, the notion of "special dependency on, and/or attachment to, land or local/localized *resources/opportunities*" is also highlighted. The Toolbox takes the example of a variety of Indigenous communities and the difficulties they face, including a checklist of issues to consider, while retaining the very limits of a general framework and the use that States can be made of it. This requires tools specifically dedicated to Indigenous situations and rights. We can mention the Peninsula Principles that were approved in 2013 by a group of lawyers and experts specializing in climate displacement and relocation (Displacement Solutions, 2013). Peninsula Principles are based on eighteen principles that provide very concrete guidance for States about the type of obligations they must fulfill to respect the rights of climate-displaced persons at each stage of displacement and relocation. They take a comprehensive approach to internal displacement with an inclusive definition of those affected: "individuals, households or communities who are facing or experiencing climate displacement" (Principle n°2). The aim is clearly to go beyond the dominant individualist approach in international law. Conversely, the Agenda for the protection of cross-border displaced persons in the context of disasters and climate change adopted by 114 States on 13 October 2015 as part of the Nansen Initiative deals only with individual migration, leaving aside communities (e.g., from small island States). The only references to collective displacement are provisions for the adoption of bilateral or multilateral agreements to facilitate the cross-border movement of nomadic pastoralists and their livestock. While nomadic territories do not necessarily have the same boundaries as those drawn by States, especially when the environment (as desert) can draw unstable borders, "pastoralists use

migration as a traditional coping method to access water and grazing land in time of environmental stress" (Nansen Initiative, 2015, 36). The Agenda calls on States not to oppose the crossing of borders and to respect "traditional *informal agreements*". To conclude, although they do not specifically address climate-related displacement and relocation, we can mention the adoption of the Global Compact for Safe, Orderly and Regular Migration and the Global Compact on Refugees in December 2018. These two instruments can be a step towards the possible establishment of an international legal status for environmentally displaced persons, all the more since, in the first one, it is very clearly stated that States should "cooperate to identify, develop and strengthen solutions for migrants compelled to leave their countries of origin owing to slow-onset natural disasters, the adverse effects of climate change, and environmental degradation, such as desertification, land degradation, drought and sea level rise, including by devising planned relocation and visa options, in cases where adaptation in or return to their country of origin is not possible". The situation of Indigenous peoples is also rapidly being addressed from the perspective of reducing their vulnerabilities by establishing "comprehensive policies" that provide them "regardless of their migration status with necessary support at all stages of migration through identification and assistance, as well as protection of their human rights" (Objective n°7). We can also mention the Sydney Declaration of Principles on the Protection of Persons Displaced in the Context of Sea Level Rise adopted at the 78th Conference of the International Law Association in August 2018. The aim of this Declaration is to raise awareness on the urgency for action regarding threats posed by sea level rise, particularly displacement of affected populations. Interestingly, the Declaration is based on a certain number of resolutions adopted by the UN General Assembly which emphasize the need of inter-State cooperation and assistance of the international community so that States "develop and implement strategies to protect themselves and their vulnerable natural marine ecosystems from the particular threats of sea level rise caused by climate change" [even if we notice that Indigenous communities are not cited].

This brief analysis tends to show us that while there is a progressive integration (albeit sometimes insufficient) of the specific constraints Indigenous peoples are facing, it is mainly based on the recognition of their cultural specificities, and less on the basis of their right to self-determination in the broader context of their marginalization within the legal and political space of the State.

Conclusion

The current practice of States faced with the need to manage climate relocation of part of their populations illustrates the difficulties faced by indigenous peoples in obtaining recognition of their specificities, particularly their special relationship with their lands and island environment. However, these issues are at the heart of Indigenous relocation and raise the question of the place of Indigenous status in the regime of climate displacement and relocation. Even if Indigenous communities cannot move without government assistance, it should not be a pretext for States to curtail their right to self-determination. Nor should the legal and institutional obstacles they face be used as a pretext for diluting their Indigenous status in the "common law". Climate relocation should not "lead to their double discrimination as environmentally displaced and Indigenous peoples" (European Parliament, 2018) and calls for a specific legal protection. Community members must have the possibility to say individually and collectively how they intend to perpetuate their legal, territorial, and cultural specificities during and after relocation. Besides, the recognition of Indigenous communities as distinct legal and political entities promotes the full and effective participation of Indigenous peoples in decision making processes. Conversely, their full participation can help to reconcile antagonisms over Indigenous identity and sovereignty by creating new forms of governance.

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

Alexander, K.S., Ryan, A., Measham, T. G., 2012, "Managed retreat of coastal communities: understanding responses to projected sea level rise", *Journal of Environmental Planning and Management*, 55, 4, 409-433.

Beck Consulting, 2012, "Strategic Management Plan: Newtok to Mertarvik", Prepared for the Division of Community and Regional Affairs of the Department of Commerce, Community, and Economic Development of the State of Alaska, 38.

Bronen, R., 2014, "Climate displacement in the United States - The case of Newtok village, Alaska", In LECKIE, Scott, *Land Solutions for Climate Displacement*, Routledge, 1st edition, 431-438.

Cameron, S. E., 2012, "Securing Indigenous politics: A critique of the vulnerability and adaptation approach to the human dimensions of climate change in the Canadian Arctic", *Global Environmental Change*, 22, 103-114.

Cernea, M. M., 2003, "Pour une nouvelle économie de la réinstallation : critique sociologique du principe de compensation", *Revue internationale des sciences sociales*, 1, 175, 39-48.

Cernea, M. M., Kanbur, R., 2002, "An exchange on the compensation principle in resettlement", Working Papers, Cornell University, Ithaca, N.Y., 20-46.

Chevalier, E., 2017, Beyond isolated Atlantises in an infinite ocean: Replacing the climate change and migration nexus in the context of territorial networks in the South Pacific. In: Gesing, F., Herbeck, J., Klepp, S., *Denaturalizing Climate Change: Migration, Mobilities and Space*, ARTEC Paper, 200, 66-76.

Displacement Solutions, 2013, "The Peninsula Principles on climate displacement within States",

http://displacementsolutions.org/wp-content/uploads/2014/12/Peninsula-Principles.pdf.

European Parliament, 2018, "Report on violation of the rights of Indigenous peoples in the world, including land grabbing", 29 May 2018, A8-0194/2018, 41.

Farbotko, C., Lazrus, H., 2012, "The first climate refugees? Contesting global narratives of climate change in Tuvalu", *Global Environmental Change*, 22, 2, 382-390.

Farbotko, C. & al., 2018, "Transformative mobilities in the Pacific: Promoting adaptation and development in a changing climate", *Asia & The Pacific islands in the twenty-first century*, 5, 3, 1-15.

FEMA, no date, "Benefit-Cost Analysis", https://www.fema.gov/benefit-cost-analysis.

First Peoples' Convening on Climate-Forced displacement, 2018, *First Peoples' and Indigenous' Peoples Declaration*.

Gemenne, F., 2010, "Tuvalu, un laboratoire du changement climatique ? Une critique empirique de la rhétorique des 'canaris dans la mine'", *Revue Tiers Monde*, 4, 204, 89-107.

Gray Glenn & Associates, 2010, "Kivalina Consensus Building Project, Final Project Report", Report prepared for the City of Kivalina, 49. Grydehøj, A., Nadarajah, Y., Markussen U., 2018, "Islands of indigeneity: Cultural distinction, indigenous territory and island spatiality", *Area*, 52, 1, 14-22, https://doi.org/10.1111/area.12520.

Indigenous peoples' Global Summit on Climate Change, 2009, *The Anchorage declaration*.

IPCC, 2019, "Special Report on the Ocean and Cryosphere in a Changing Climate", https://www.ipcc.ch/srocc/.

IPCC, 2018, "Global Warming of 1.5°C - An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouses gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty", [Under the direction of Masson-Delmotte, V., and al.], https://www.ipcc.ch/sr15/.

IPCC, 2014, "2014: Adaptation needs and options. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects", Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, [under the direction of Noble I.R., Hug., S., Anokhin, Y.A., Carmin, J., Goudou, D., Lansigan, F.P., Osman-Elasha, B., Villamizar, A.], Cambridge University Press, 833-868.

Magnan, A., 2009, "Proposition d'une trame de recherche pour appréhender la capacité d'adaptation au changement climatique", *Vertigo*, 3, 9, https://doi.org/10.4000/vertigo.9189.

Marino, E., 2015, *Fierce Climate, Sacred Ground: An ethnography of Climate Change in Shishmaref, Alaska*, University of Alaska Press.

Marino, E., 2012, "The long history of environmental migration: Assessing vulnerability construction and obstacles to successful relocation in Shishmaref, Alaska », *Global Environmental Change*, 22, 2, 374-381.

Marino, E., Lazrus, H., 2015, "Migration or forced displacement? The complex choices of climate change and disaster migrants in Shishmaref, Alaska and Nanumea, Tuvalu", *Human Organization*, 74, 4, 341-350.

Shearer, C., 2012, "The political ecology of climate adaptation assistance: Alaska Natives, displacement and relocation". *Journal of Political Ecology*, 19, 9, 174-183.

Shearer, C., 2011, *Kivalina: A Climate Change Story*, Haymarket Books, 200.

The Committee on International Law and Sea Level Rise, 2018, "Sydney Declaration of Principles on the Protection of Persons Displaced in the Context of Sea Level Rise", Resolution 6/2018 at the 78th Conference of the International Law Association, Sydney, Australia.

The Nansen Initiative, 2015, "Agenda for the Protection of Cross-border Displaced Persons in the Context of Disasters and Climate Change", 64, https://www.nanseninitiative.org/global-consultations/.

Thornton, T., Manasfi, N., 2010, "Adaptation – Genuine and Spurious, Demystifying adaptation processes in relation to climate change", *Environment and society*, 9, 132-155.

UNESCO, 2010, *Climate change and Arctic sustainable development: scientific, social, cultural and educational challenges*, UNESCO, 357.

UNHCR, SFS Georgetown University, IOM, 2017, "A Toolbox: Planning Relocations to Protect People from Disasters and Environmental Change", 66.

UNHCR, Georgetown University, Brookings Institution, 2015, "Guidance for protecting people from disasters and environmental changes through planned relocations", 22.

USACE, 2006, "Relocation Planning Project, Master Plan, Kivalina, Alaska", Report prepared by Tryck Nyman Hayes and URS Corporation, 108.

US GAO, 2009, "Alaska Native Villages: Limited progress has been made on relocating villages threatened by flooding and erosion", 53.

US GAO, 2003, "Alaska Native Villages: Most are affected by flooding and erosion but few qualify for federal assistance", 91.

UN General Assembly, 2018, *Global Compact for Safe, Orderly and Regular Migration: resolution/adopted by the General Assembly*, 19 December 2018, A/RES/73/195.

UN General Assembly, 2017, United Nations Declaration on the Rights of Indigenous Peoples: resolution/adopted by the General Assembly, 2 October 2007, A/RES/61/295.

UN General Assembly, United Nations Framework Convention on Climate Change: resolution/adopted by the General Assembly, 20 January 1994, A/RES/48/189.

Walshe, R.A, Stancioff, C.E, 2018, "Small island perspectives on climate change", *Island Studies Journal*, 13, 1, -24.

Weerasinghe, S., 2014, "Planned relocation, disasters and climate change: Consolidating good practices and preparing for the future", Report prepared with the support of UNHCR and Brookings Institution, San Remo, Italy, 36.

Wild, R., McLeod, C., Valentine, P., (eds.), 2012, *Sacred natural sites: guidelines for protected area managers*, In partnership with Man and the Biosphere Programme (UNESCO), IUCN, 131.

Whyte, Kyle, 2017, "Way Beyond the Lifeboat: An Indigenous Allegory of Climate Justice", In Munshi, D., Bhavnani, K., Foran, J., Kurian, P. (eds.),

Climate Futures: Reimagining Global Climate Justice, University of California Press, 400.

"The Anthropocene and islands: vulnerability, adaptation and resilience to natural hazards and climate change" include 8 original research chapters, of authors from around the world, explaining how islands are affected by natural hazards and global change. The volume contributions range from small islands in Alaska to large ones such as Sicily in the Mediterranean and focus on facts such as water resources, sustainability and societal impacts of risk and climate change. The author's reflections share a wide scientific approach that will enrich a subject, islands and its future, which will become more and more important in the next decades.

Miquel Grimalt is Lecturer at the Geography Department of the Universitat de les Illes Balears in Mallorca (Spain) and director of the Climatology, Hydrology, Natural Hazards and Landscape Research Group. He holds a PhD in Geography with a thesis about natural hazards and floods. He is author or coauthor of several papers published in international or national journals. His main research interests are climatology, risk geography and anthropical geomorphology.

Anton Micallef is an Associate Professor at the University of Malta lecturing at the Institute of Earth Systems on the Mediterranean coastal and marine environment, coastal hazards, coastal risk management and ocean systems. His area of specialisation is Coastal Geomorphology and Integrated Coastal Area Management, particularly that related to Beach Management. Since 1989, he has served as the Director of the Euro-Mediterranean Centre on Insular Coastal Dynamics (ICoD), a Council of Europe specialized Centre pertaining to the EUR-OPA Major Hazards Agreement.

Joan Rosselló is an Associate Lecturer at the Universitat Oberta de Catalunya and member of the Climatology, Hydrology, Natural Hazards and Landscape Research Group. A geographer, his PhD was focused on flash floods and its impact in Mallorca. His main research interests are historical extreme events, flash floods and societal impacts of extreme events.

ISBN 979-12-80064-02-8



