INSTITUTE OF LAW, POLITICS AND DEVELOPMENT

Sant'Anna School of Advanced Studies – Pisa

BICL British Institute of International and Comparative Law

3CSA

The Role of Science in Climate Change Litigation

International Workshop

#ALL4CLIMATE ITALY 2021

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This report summarises the respective presentations made by speakers as part of the International Workshop "The Role of Science in Climate Change Litigation", jointly organised by SSSA, BIICL and 3CSA on 14-15 July 2021.

The views of speakers are their own and do not necessarily reflect the views of BIICL, SSSA, 3CSA or the editors. Please cite accordingly, for example:

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Executive Summary

The Sant'Anna School of Advanced Studies (SSSA, Pisa), the British Institute of International and Comparative Law (BIICL, London), and the Center for Climate Change Studies and Sustainable Actions (3CSA, Pisa/Pavia) co-organised an international workshop on "The Role of Science in Climate Change Litigation" on 14-15 July 2021. The workshop was integrated in the Seasonal School on Climate Change and International Law: Interdisciplinary Perspectives held from 12 to 16 July 2021 at the SSSA. The event was also listed as one of the "All4Climate - Italy 2021" initiatives of the Italian Ministry of Ecological Transition, which aims to promote 2021 as the Year of Climate Ambition.

Climate change litigation is rapidly spreading, with more than 1800 cases filed so far around the globe. Increasingly, climate science has been playing a crucial role in these cases, providing supporting evidence and helping to address issues such as 'attribution' and 'risk assessment'. Initiatives such as this workshop give the opportunity of the two communities of legal and scientific experts, to discuss inter-related issues, and to identify how science can further play a role in climate change litigation. They can also help, for example, to clarify existing legal obligations of States and private actors to prevent or respond to climate change.

Discussions were organised in four panels, which focused on the following topics:

- Perspectives from Climate Science
- Perspectives from Law: Crosscutting Issues
- The Role of Science in National Climate Litigation
- The Role of Science in International Environmental and Climate Change Litigation

This event was organised and convened by Roberto Buizza, Professor of Physics, SSSA, and Director, 3CSA; Christine Bakker, Visiting Research Fellow, BIICL and Visiting Lecturer, SSSA; Ivano Alogna, Arthur Watts Research Fellow in Environmental and Climate Change Law, BIICL, and Jean-Pierre Gauci, Arthur Watts Senior Research Fellow in Public International Law and Director of Teaching and Training, BIICL.

The present report provides a summary of the discussion and synthesises some of the main conclusions of the four panels, as well as the introductory remarks and the concluding discussion. When citing extracts from this report, please provide a full reference as mentioned above (p. 2).

The organisers wish to thank the speakers for their participation and for making this workshop a resounding success. Special thanks to Leigham Strachan (BIICL Events Team) for ensuring the smooth running of the workshop.

1. Introductory Remarks

Sabina Nuti, Rector of SSSA, and **Spyros Maniatis**, Director of BIICL, opened the International Workshop with their welcome address. They emphasised the importance and the urgency of the climate change challenge. They stressed that an interdisciplinary approach, and a dialogue between social and applied sciences in particular, is key to lead human society to a solution. With this workshop, SSSA and BIICL aim to contribute to facilitating this dialogue, by bringing together high-level climate scientists on the one hand, and international legal scholars and practitioners on the other. For both institutions, this event is part of a broader engagement related to climate change. **Nuti** highlighted that SSSA carries out climate change-related research and teaching in various disciplines, including physics, economics, philosophy, political science, and law. To further develop an interdisciplinary approach in this field, SSSA has established, together with the Scuola Normale di Pisa and IUS Pavia, the Center on Climate Change and Sustainable Action (3CSA). **Maniatis** mentioned that BIICL has also developed a strong programme of work related to climate change over the past 2 years, including specialized training courses on climate change law; several workshops, webinars and publications, and a conference on the separation of powers in the context of climate change litigation. Nuti and Maniatis both stressed that the cooperation between the two institutions for this workshop has allowed to assemble scientists and legal experts from around the world, but mainly from the UK and Italy, the two countries in charge of the upcoming climate conference in Glasgow, COP 26, and the Pre-COP Ministerial meeting in Milan. **Francesca Capone**, Assistant Professor of International Law at SSSA, introduced the Seasonal School on "Climate Change and International Law: Interdisciplinary Perspectives", which she coordinated together with Christine Bakker, to the panellists and the audience. This one-week summer course was offered by the SSSA from 12 till 16 July to graduate and Master students and PhD candidates from various academic disciplines and from different countries. It aimed to provide a first introduction to the main issues related to climate change from different perspectives: science, economics, philosophy ethics, and law, with a special focus on the role of international law. The workshop was integrated in this seasonal school, allowing the students to attend this two-day event and to pose their questions to the panellists. **Alyssa Gilbert**, Director of Policy and Translation at the Grantham Institute for Climate Change and the Environment of the Imperial College of London, introduced the activities of the COP26 University Network. This is a growing group of over 80 UK-based universities and research centres that aim to raise ambition for tangible outcomes from the Glasgow COP26. The main idea at the basis of the Network is to build a bridge between academic expertise and policy delivery on climate change. The Network supports the COP negotiations by easing access to evidence and academic expertise for government, non-governmental organisation (NGOs), and other actors. Gilbert stressed the cooperation between Italian universities and the Network. An illustrative example of this fruitful cooperation was the "Climate Exp0", a virtual conference organised by the Network in conjunction with the Italian University Network for Sustainable Development (RUS) in May 2021.

After the welcome address, the convenors welcomed the panellists and the audience and set the scene for the workshop. **Roberto Buizza**, Professor of Physics at SSSA and Director at 3CSA, recalled that the workshop is part of the "All4Climate – Italy 2021" initiative promoted by the Italian Ministry of Ecological Transition. Buizza stressed that knowledge sharing and collaboration between different communities of experts is necessary to address the complexity of the climate change challenge. The new interdisciplinary PhD program in "Sustainability and Climate Change", coordinated by Istituto Studi Superiori IUSS of Pavia and due to start on 1 November 2021, which involves 30 Universities and offers 105 scholarships in 6 thematic areas, is an example of this increasing interdisciplinary dialogue. Buizza also emphasised the uncertainty that governs climate science, both in its observations and future projections. It is, thus, of fundamental importance to be able to apply a probabilistic approach to estimate the uncertainty as accurately and reliably as possible, also when dealing with litigation cases. **Christine Bakker**, Visiting

Research Fellow at BIICL and Visiting Lecturer at SSSA, recalled how the workshop follows up on earlier events and research activities focusing on climate change litigation carried out both at the SSSA's Dirpolis Institute, and at BIICL, including a first workshop held in London in January 2020, which led to the publication of the edited book on "Climate Change Litigation: Global Perspectives" (BRILL, 2021). Bakker then presented the agenda of the two-day workshop. The workshop was composed of four panels, two panels per day. In order to stimulate an interdisciplinary dialogue, a lawyer and climate negotiator chaired the panel composed of scientists, and scientists chaired two of the panels composed of legal experts and practitioners. **Ivano Alogna**, Arthur Watts Research Fellow in Environmental and Climate Change Law at BIICL, made clear that current measures are far away from the goal of stabilising the concentration of greenhouse gases in the atmosphere and rather head for a temperature rise of 3°C over this century. Different actors with different responsibilities, such as governments, corporations, but also individuals, play a role in this crisis. Litigation is emerging as one possible solution to this problem. Courts and tribunals are flooded with lawsuits; these legal initiatives are, according to Alogna, an exercise of active democracy. A solid alliance between the science and the law is key to delivering results. Scientific objectivity has to be balanced with the great differentiation and diversity that lie at the basis of the global climate regime. **Jean-Pierre Gauci**, Arthur Watts Senior Research Fellow in Public International Law and Director of Teaching and Training at BIICL, posed some initial questions on the relationships between science and the law. How can a smooth communication between the two communities of experts be enhanced? For instance, how can the scientists communicate the complexity of climate science in a way that is accessible to judges, lawyers and all those engaging in climate litigation? In addition, what can be learnt from other fields, such as tobacco and medical claims, about the interconnection between law and science? And finally, what can academics and researchers do to bridge the divide, if indeed one exists, between the law and science in the field of climate change? The two-day workshop dealt with all these intriguing challenges.

2. First Panel: Perspectives from Climate Science

The first panel on "Perspectives from Climate Science" opened the workshop by providing a detailed overview of where we stand today in terms of climate science, integration of climate science in national and international climate policies, and attribution of climate-change related harm. The panel was chaired by **Christina Voigt**, Professor of Law at the University of Oslo and Steering Committee Member of the IUCN-WCEL.

Climate Science: Where Do We Stand Today?

Filippo Giorgi, Director of the Earth System Physics Section at the International Center for Theoretical Physics (ICTP) of Trieste, provided an updated view of climate science. Giorgi started by illustrating three key facts. First, there is scientific consensus that global warming is happening. The global average temperature is continuing to increase; today, it is about 1.2°C hotter compared to the beginning of 20th century. The speed of the warming is particularly worrying. Second, most of the current global warming is due to anthropogenic emissions of greenhouse gases, as asserted by the IPCC with more than 95% of probability. Global warming is mainly due to carbon dioxide linked to the burning of fossil fuels, as well as methane from intensive farming. Third, global warming is altering profoundly many aspects of the climate system. In particular, it modifies the global circulation and precipitation patterns, increases glacier melting, induces a sea level rise, and intensifies the hydrologic cycle, leading to a surge in extreme weather events. Giorgi recalled that the adverse effects of climate change on natural ecosystems and different socio-economic sectors are already seen throughout the world. The current human-induced perturbation probably does not have any precedent in interglacial periods during the most recent million years, and the planet can be affected by it for hundreds of years in the future if no action is taken. Moreover, Giorgi underlined the spatial and temporal specificities of the climate change phenomenon, which create some ethical and legal problems. Spatially, the impacts of climate change are heterogeneous around the world, with some clear "hot spots", such as the Arctic, the Amazon, Southern Africa and the Mediterranean basin. These "hot spots" not always coincide with the largest emitters: the primary contributors to climate change are not the primary victims. Temporally, the climate system is characterised by a pronounced inertia, so that perturbations to the system are carried over long times. This creates a clear cross-generational issue, as the effects of what our and previous generations have done will be felt primarily by "innocent" future generations. Addressing climate change is possible: science and technology are given us clear messages that there are real possibilities to keep global warming below what is considered a "danger threshold" of 2°C and it offers a portfolio of mitigation options at sustainable costs (around 0.04-0.14 of the global GDP).

The Integration of Climate Science in National and International Climate Policies

Martin Siegert, Co-Director of the Grantham Institute – Climate change and Environment, at the Imperial College of London, studies, as a glaciologist, the effects of climate change on the huge polar ice sheets. From ice core records, obtained from deep within the East Antarctic ice sheet, it is possible to reconstruct the atmospheric conditions of up to nearly one million years ago. From these observations it clearly emerges that the atmospheric concentration of carbon dioxide over the last million years has never been as high as today. Siegert showed that there is an almost linear relationship between the global average temperature increase, the CO2 concentration in the atmosphere and, since industrialisation in the mid 19th Century, carbon dioxide emissions from fossil fuel burning. Rising sea level from the expansion of the ocean as it warms and, increasingly, from ice-sheet melting, pose an existential threat to low lying coastal regions over the coming century and beyond. Several coastal cities, and hundreds of millions of people, are located very close to the coast just a few meters above sea level. For these populations, sea

level change in the coming decades will present major challenges - in either adapting to inevitable loss of land or through migration to higher regions. Though the sea level problem is significant, similar problems lie in store because of heat waves, cropland decline, flooding, and water stress; each posing threats to planetary habitability. Siegert showed that the impacts, and in particular the future increase of the risk of extreme damages, can be significantly reduced by fulfilling pledges to reduce greenhouse gas emissions defined in the Nationally Determined Contributions (NDCs) and, more importantly, by increasing the ambition and enhancing mitigation action further. If we can achieve 'net zero' emissions of greenhouse gases by mid-Century it is possible we can avoid the most damaging future scenarios. At the moment, unfortunately, although stated ambitions are increasing, the policies in place cannot drive the changes that are needed to reduce, and eventually stop, global warming. COP26 represents an opportunity for the world to agree to commit to 'net zero' by 2050, and to form and enact the policies to deliver it.

Attribution of Climate Change-Related Harm to Individual States or Private Companies

Myles Allen, Professor of geosystem science at the Oxford University, opened his speech by reiterating that global warming due to anthropogenic carbon emissions has now reached 1.2°C (with respect of 1900). Considering that it is possible to trace where the greenhouse gases' emissions (that caused the warming) come from, one could think that the attribution (i.e., the identification of where most of the responsibilities for the problem lies) would be a pretty simple enterprise. Unfortunately, this is not the case, mainly because most climate harm is not directly associated with the global average temperature increase, but it is due to single, extreme weather events. It is very difficult to prove that a given extreme event would never have occurred "but for" anthropogenic climate change. Discussing these themes, Allen presented the two main scientific approaches that are applied to understand the attribution of harm from extreme events. The first approach is risk-based, and aims to estimate how climate change increased the risk of a given harmful event. Allen presented computer simulations and in silico experiments his research team performed to study the climate change attribution of the UK floods of January 2014. He showed that climate change increased the probability of this event happening. The second approach is the so-called "storyline approach". Allen applied it to the case of Superstorm Sandy. The research question that is addressed following this approach is the following: assuming it happened anyway, how much weaker would the superstorm has been without the (climate-change induced) warming of the Atlantic Ocean temperatures? The two approaches do not always provide completely aligned answers. In some cases, for example, applying an external forcing (e.g., due to the human-induced climate warming) to a simple chaotic weather model, the probability of extreme weather events is overall reduced, but the magnitude of individual extreme events increases. Work is progressing to understand how best to use and reconcile the two approaches, by analysing the impact of varying carbon dioxide in the actual forecast models used to forecast extreme events. These studies are important to understand how external drivers affect both probability and magnitude of extreme events.

3. Second Panel: Perspectives from Law: Crosscutting Issues

The second panel on "Perspectives from Law: Crosscutting Issues" introduced climate litigation and focused on human rights-based climate litigation and corporate due diligence. The panel was chaired by **Mario Martina**, Professor of Hydrology and Risk Management at Scuola Superiore IUSS Pavia; 3CSA.

Main Trends in the Use of Science in Climate Change Litigation – General Insights

Joana Setzer, Professorial Research Assistant at the Grantham Institute for Climate Change at London School of Economics, gave an overview of the use of science in climate litigation, setting the scene for the following panellists zooming in on more detailed aspects. Setzer provided a concrete indication of how the role of science in climate litigation evolved over the last decade. Today, science is playing a central role in climate litigation. Judges are fully conscious that they have to deal with climate science. Even the defendants usually accept what the scientific community has reached consensus on. Standing rights are eased due to the increasing scientific evidence about climate change impacts and courts are increasingly attaching legal consequences to governments that fail to act. Yet, the causal link between emissions and harms is still very difficult to be proven before a court. Setzer gave some examples of the positive collaboration between scientists and lawyers. In the *Urgenda* case climate science was very instrumental, in particular for establishing the duty for the Netherlands to do its "fair share" in reducing emissions. The 2014 study by Richard Heede on source attribution led to a surge in cases filed against the Carbon Majors. Such cases do not only seek accountability and compensation for loss and damages, but they also attempt to change the behaviour of these companies by binding them to substantially cut their emissions in the near future. Setzer concluded by discussing another recent study that shows how the scientific evidence submitted in current cases concerning causal claims about the effects of defendants' emissions on plaintiffs lags considerably behind the state-of-the-art. An increase in collaboration between scientists and lawyers is thus key to accelerate progress and enhance success in court.

The Use of Science in Human Rights-Based Climate Change Litigation

Annalisa Savaresi, Associate Professor in International Environmental Law at the University of Eastern Finland and Senior Lecturer in Environmental Law at the University of Stirling, provided the following definition of human rights-based climate change litigation: "lawsuits raising questions of law or fact regarding climate science, climate change mitigation or adaptation, which are brought before international or domestic judicial, quasi-judicial and other investigatory bodies and which rely in whole or in part on human rights" (A Savaresi, J Setzer, 2021). At the moment, human rights-based climate cases represent only a tiny fraction of climate litigation: 112 cases out of more than 1800. Yet, these cases are attracting great attention, also because of some important successes such as the *Urgenda* and *Royal Dutch Shell* cases. Science has been used in human rights-based climate cases in three main ways. Firstly, to establish the serious risk of human rights violations associated with the projected impacts of climate change. Secondly, to substantiate the content of State and corporate obligations in relation to climate change. Thirdly and finally, climate science is being used to establish a causal link between emissions and human rights violations, for example in the still ongoing *Sacchi* et al. complaint before the UN Committee on the Rights of the Child. Savaresi stressed that differences between human rights-based and other types of climate litigation should not be overemphasised, as science plays a similar role in all climate litigation. Yet, on average, the burden of proof for the applicants is lower in rights-based cases if compared, for instance, to tort law. In addition, some human rights bodies are normally less formalistic

than courts in the use of sources, and they could more easily rely on scientific evidence. All in all, human rights-based cases are very likely to continue to increase in the near future, hence scientists will be more and more called on to help lawyers.

The Impact of Science on Corporate Due Diligence Related to Climate Change

Jason Reeves, Managing Partner at Zelle LLP in London, and **Deepa Sutherland**, Senior Associate at Zelle LLP in London, opened their presentation by clarifying their specific role as insurers' lawyers in climate litigation: as lawyers they mostly defend insurance companies, who have a duty to defend and indemnify their policyholders against claims made against them by third parties. From their perspective, the role of science in climate litigation roughly coincides with the role of experts in such litigation. They stressed that not only in the climate change field but in most "technical cases", experts are fundamental for the outcome of the case. Their role, however, really changes based on the different jurisdictions. For example, in the US, experts can be called as advocates for a given party to the case. In most civil law jurisdictions, courts can rely on their own experts. The speakers focused on the second wave of public nuisance-based climate cases against fossil fuels corporations in the US and argued that the developments in climate science and in the evidence provided by the experts is likely to lead to a higher rate of success if compared to previous similar cases. The speakers stressed that similarities can be drawn between climate cases and previous pollution and environmental cases, and cases on tobacco, asbestos and MTBE. In their opinion, however, a key difference is that human society, at the moment, cannot get rid of hydrocarbons without very high costs. This poses an unprecedented challenge. They finally recalled that insurance is a key stakeholder in the climate change issue. Insurers' exposure to climate change is twofold. On the one hand, such exposure depends on investor risk and shareholder obligations, and on the other hand, it is related to the underwriting side and paying claims. There is an increasing pressure to attempt to quantify this exposure and to take it into account. Their unique role and the size of the industry itself put insurers in a really strong position to push for a change in corporations' behaviour and incentivise the transition.

4. Third Panel: The Role of Science in National Climate Litigation

The third panel on "The Role of Science in National Climate Litigation" gave an overview of national climate litigation and was chaired by **Sarah Mead**, Legal Associate at Climate Litigation Network and Climate Litigation Project Co- Coordinator of WCEL Climate Change Specialist Group IUCN.

The Role of Science in Climate Change Litigation in the Global South

Jolene Lin, Associate Professor at the National University of Singapore's Faculty of Law in Singapore, talked about the role of science in climate change litigation in the Global South. Having examined over 100 cases from Asia, Africa, and Latin America in the last two years, it can be said that there are more periphery cases than core cases (cases in which climate change is a central issue) in the Global South. The reason for having more cases in which climate change is a peripheral issue is the absence of or less well-developed climate law frameworks. In addition, packaging of climate change with other issues deemed to have higher public policy salience, as climate change issues alone tend to be seen as having lower public policy salience than issues such as poverty or public health. Lastly, a case often has to focus on non-climate issues to bring the lawsuit within a particular statutory framework. Looking at the key characteristics of Global South climate litigation, it can be said that there is a prevalence of rights-based claims, a preference for the enforcement of existing laws, and that climate litigation is rather conveyed cautiously and quietly because of concerns about judicial reluctance. Against this background, it is not surprising that climate jurisprudence does not reflect much engagement with climate science. It also has to be considered that it depends which actors bring the lawsuits and whether they have access to the latest science. Moreover, the attitude of courts plays an important role, as well as the aim of cases; an engagement with attribution science is not existing because no case seeks compensation. What is more, in illegal logging cases, no scientific evidence at all has been brought before the court. Overall, vast possibilities await the use of science in, and climate litigation more broadly, in the Global South.

The Role of Science in Climate Change Litigation in the United States

Daniel Metzger, Climate Law Fellow at the Sabin Center for Climate Change Law at Columbia University, talked about US cases filed by state and local authorities against fossil fuel producers, asserting tort or adjacent theories and grounded in the notion that the companies' conduct was unreasonable or wrongful. None of the cases claim that a single defendant is entirely responsible for any specific climate impact, but rather they proportionally quantify "responsibility" for climate change and argue that the defendant companies are profiting from activities that contribute to climate change, intentionally obfuscating climate science, and lobbying to prevent action on climate change. Several challenges occur when looking at those cases: (1) determining what share of responsibility for climate change each defendant bears, (2) demonstrating that climate impacts are foreseeable to a precise enough degree to justify responses, (3) identifying and describing risks of which persons and entities charged with managing risks are, or should be, aware, and (4) determining the extent to which certain extreme weather events were made more likely to occur or made more severe by climate change. Attribution science can be used to overcome these challenges, but advocates must still be prepared to defend science at trial, as uncertainties can come up due to confounding variables. Moreover, it is difficult (but not impossible) to describe impacts at finer scales than the climate models themselves operate. Lastly, advocates should be cautious but accepting of studies that convey their results in terms of degrees of confidence rather than firm conclusions.

The Role of Science in Determining the Adequacy of State's Mitigation Efforts: Lessons from the Dutch *Urgenda* case

Dennis van Berkel, Legal Counsel to the Urgenda Foundation and Director of the Climate Litigation Network, focused on climate litigation that seeks to compel States to take more ambitious climate action going forward. Science – in particular that produced by the IPCC and national science institutes – plays an important role in these types of cases. Such existing analysis can be used to establish the risk of climate-related harm, and thus the duty on the State to take preventive climate action – as evidenced by decisions of courts in the Netherlands, Belgium, France, and Germany. Taking a closer look at the Urgenda case, Van Berkel highlighted that the uncertainty regarding the precise impacts of climate change in the Netherlands (for instance, who will be impacted and when) did not pose a barrier to a finding of a duty on the State to protect. This was also the finding of the court in the Belgian case (Klimaatzaak) and the German case (Neubauer) which also found that the claimants had standing and that the respective States had a duty to protect them from climate harms. If a court decides that the State has a duty to protect, a question arises as to what the State must do to discharge that duty. Science can play a key role in this respect by providing guidance on what an individual State's 'fair share' of emissions reductions is to address the climate crisis. This research on effort-sharing methodologies is concerned with the distribution of the global effort to reduce GHG emissions between States in order to prevent levels of global warming. These methodologies, developed by the scientific community, divide the remaining emission space (or carbon budget) between States, based on different interpretations of fairness and equity. Interdisciplinary studies that assess these methodologies through the prism of principles of international environmental law are emerging. More off this research not only by individual research groups, but also by the government or government related agencies, would help to identify the legal responsibilities of States.

5. Fourth Panel: The Role of Science in International Environmental and Climate Change Litigation

The fourth panel on "The Role of Science in International Environmental and Climate Change Litigation" was chaired by **Antonio Navarra**, Director of Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC) in Bologna and Professor of Meteorology and Climatology at the University of Bologna.

The Role of Science in Environmental Cases before the International Court of Justice (ICJ)

Sandrine Maljean-Dubois, Senior Researcher at the Centre national de la recherche scientifique (CNRS) and Professor of international and environmental law at Aix-Marseille University in France, pointed out that even though the ICJ has not yet been presented with a climate case, it has a general competence to decide all matters of international law, including international environmental law, and, therefore, climate cases could arise before the Court in the future. Having a look at the Court's history, the ICJ has been approached more and more often in environmental matters.[1] Due to the role of science in all of these cases, lessons for future climate litigation can be learned. Regarding the rules of evidence (burden, standard, method of proof), parties play an important role in establishing the existence of facts. The precautionary principle, for example, does not lead to a shift of the burden of proof. Moreover, the ICJ has a wide margin in assessing the probative value of the factual and legal elements submitted by the parties. However, as could be seen in some of the environmental cases, the Court was reluctant to enter into scientific considerations and tried to avoid adjudicating on scientific issues. Thus, the Court's method of establishing facts and handling technical and scientific matters could be improved. Regarding the involvement of experts, the ICJ has a wide range of options and can decide to conduct investigations, to conduct expert appraisals, and to carry out site visits. However, it has so far only appointed experts in three cases, although the involvement of experts appointed by the Court could provide objective scientific knowledge. Still, in the *Whaling in the Antarctic* case, the Court showed itself highly engaged with the evidence given by experts called by the parties at the oral hearing. Overall, the ICJ has long remained cautious, prudent, and probably too passive, and it is rather a matter of will to make greater use of the provisions of the Court's Statute and Rules.

The Role of Science in Climate Change Cases before European Courts

Marc Willers QC, Garden Court Chambers London, explained that the *Armando Carvalho and Others v. European Parliament and the Council* case before the General Court of the European Union, which challenged three pieces of EU legislation, was based on scientific evidence presented by the scientific thinktank Climate Analytics. Unfortunately, this evidence has never been assessed by the EU General Court because the applicants did not meet the *Plaumann* requirements. The appeal, which was heard by the Court of Justice of the EU (CJEU) in early 2021, was dismissed for the same reasons. The same standing hurdle had not been overcome by the plaintiffs in the *EU Biomass Plaintiffs v. European Union* case, which challenged the treatment of forest biomass as a renewable fuel in an EU directive. Regarding

[1] For example *Gabcíkovo-Nagymaros Project* (Hungary/Slovakia) 1997, *Pulp Mills on the River Uruguay* (Argentina v. Uruguay) 2010, *Whaling in the Antarctic* (Australia v. Japan) 2014, *Certain Activities Carried Out by Nicaragua in the Border Area* (Costa Rica v. Nicaragua) 2015, and *Construction of a Road in Costa Rica along the San Juan River* (Nicaragua v. Costa Rica) 2018.

the European Court of Human Rights (ECtHR), the filed climate cases have not been decided yet.[2] Focusing on the case brought by six Portuguese young people, Willers set out that the argument is again supported by scientific evidence provided by Climate Analytics. By using this scientific evidence, the plaintiffs gave the Court a guide through the plethora of science, presenting scientific evidence in an understandable way. It shows the trajectory to which the applicants will be exposed to harm, and the disproportionate impact they face compared with the current generations. Moreover, it lays out that climate change is happening, that each Member State is being challenged and that they are not doing enough to tackle dangerous climate change. Willers pointed out that the governments' submissions in response to the application and the scientific evidence is awaited.

The Role of Science in Climate-Related Cases before the UN Human Rights Committee (HR Committee) and the Inter-American Court of Human Rights (IACtHR)

According to **Monica Feria-Tinta**, Barrister at Twenty Essex London, scientific expertise is an essential tool for proving State responsibility under international law. However, the use of scientific evidence depends on the procedure of the respective regime. Taking as an example the *Torres Strait Islanders* case before the HR Committee, in which there are no oral hearings, the evidence, including scientific evidence, is purely written. In Feria-Tinta's opinion, the trajectory of courts is going towards being more forensic when it comes to issues of evidence, but this can only take place in the context of, for example, rules of procedure. In general, scientific evidence can be brought forward in different ways in this type of international proceedings, for example in relying on IPCC reports and expert written evidence specially prepared for the case. This can be further supplemented by reference to scientific publications on the topic at stake. Regarding the IACtHR, there has not been a climate case yet. Cases have to go through the Inter-American Commission on Human Rights (IACHR) first. The rule of exhausting domestic remedies may have also delayed the process of climate change cases reaching this regional system. However, there were early attempts to bring climate change issues to the attention of the IACHR (the Inuit case), albeit not properly dealt with by the Commission, in which IPCC reports and scientific data were referred to. Concerning regional courts, litigation before the European Court of Human Rights on climate change is more advanced at present (the Court currently dealing with at least 3 cases on climate change), albeit the doctrine developed by the Inter-American System on human rights and environment has been exerting great influence on the shaping of climate change arguments in other fora. There is cross-fertilisation within systems. A successful case in one court/organ is likely to have an impact on all the other jurisdictions.

[2] See *Duarte Agostinho and Others v. Portugal*; *Union of Swiss Senior Women for Climate Protection v. Swiss Federal Council and Others*; *Mex M. v. Austria*; *Greenpeace Nordic Ass'n v. Ministry of Petroleum and Energy*.

6. Concluding Discussion: The Evolving Role of Science in Climate Change Litigation

The Concluding Discussion on "The Evolving Role of Science in Climate Change Litigation" was chaired by **Roberto Buizza**, Professor of Physics at SSSA and Director at 3CSA. Panellists were the four chairs of the panels of the two days, who provided feedback from the discussions in their session, before some final remarks on "Climate Change Litigation and Science: Connecting the Dots" were made by **Ivano Alogna**, Arthur Watts Research Fellow in Environmental and Climate Change Law at BIICL, **Christine Bakker**, Visiting Research Fellow at BIICL and Visiting Lecturer at SSSA, and **Jean-Pierre Gauci**, Arthur Watts Senior Research Fellow in Public International Law and Director of Teaching and Training at BIICL.

Christina Voigt, Professor of Law at University of Oslo in Norway, and Steering Committee Member of the IUCN-WCEL, reported from the first panel on "Perspectives of Climate Science". The first panel looked at climate science, especially focusing on different model pathways leading to different temperature increases prepared by the IPCC. Consequently, the different kind of impacts of the pathways and the implications for the law were examined. This was particularly important for the legal community as a discussion evolved around how to translate, and enforce, the temperature goals of the Paris Agreement. A second important topic that was discussed was attribution science, a very crucial aspect in many climate litigation processes. A third important topic that was discussed was that of global equity, and how to ensure that actions designed to address climate change guarantee also equity and justice, both spatially (across the different countries) and temporally (across generations).

Mario Martina, Professor of Hydrology and Risk Management at Scuola Superiore IUSS Pavia and 3CSA, reported from the second panel on "Perspectives from Law: Crosscutting Issues", which focused on the perspective from the law on the role of science in climate change litigation. From a general perspective, science is playing an increasingly important role in climate change litigation, as indicated, for example, by the fact that courts throughout the world accept the scientific evidence that society and the planet are facing a vast systematic danger in global emissions. In the future, an even stronger collaboration between scientists and lawyers will further increase the role of science. Finally, Martina reported that science is also increasingly used to support claims in climate litigation cases that involve also human rights in corporate due diligence climate change cases.

Sarah Mead, Legal Associate at Climate Litigation Network, and Co-Coordinator of a climate litigation project of the WCEL Climate Change Specialist Group of the IUCN, reported from the third panel on "The Role of Science in National Climate Litigation", which took a 'global tour' of climate litigation, focusing on cases in the Global South, the US, and Europe. Mead reported that in all national climate cases discussed in this panel, and particularly in those where climate change was a core issue, climate science has served as an essential foundation. The key takeaway from this panel is that very few defendants dispute the core conclusions of climate science (e.g., that human activities are causing climate change). However, defendants dispute what this means in terms of their legal responsibilities. For example, in cases that involve government actors, the findings of the IPCC are not disputed by governments, but what is still not agreed is what individual countries must do in order to do 'their part' to prevent dangerous climate change; or for corporate actors, whether they are responsible for climate-related damages.

Antonio Navarra, Director of Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC) in Bologna and Professor of Meteorology and Climatology at the University of Bologna, reported from the fourth

panel on "The Role of Science in International Environmental and Climate Change Litigation". One of the key aspects that emerged from this panel was the huge diversity in how courts deal with climate litigation cases among countries. Every case has some different characteristics, and as a result it is treated in a different way. However, even though those differences exist, the importance of science and the role of experts in the process has been confirmed in all international legal systems. Regarding the role of experts in the process, there still must be found a way to use experts as witnesses in a fruitful and useful way.

Making the final remarks, **Christine Bakker**, **Ivano Alogna** and **Jean-Pierre Gauci** highlighted some of the main points that emerged during the two days of the international workshop. The discussions highlighted three sets of key challenges that should be addressed, (1) those related to communication, (2) those related to the use of science in climate cases from a *'procedural'* (or *'practical'*) *perspective*, and (3) those related to the use of science in climate cases from a *'substantive' perspective*. The first set of challenges includes the need of further clarification of terms (such as the exact meaning of the agreed temperature goal, or 'foreseeable risks') across different disciplines, and a more widespread communication of accessible scientific data to a wider public, including the legal community. The second set of challenges include the question how litigators can gain access to scientific data and analysis; how litigators and judges can increase their capacities to use those data to support their legal arguments; and how a negative attitude among judges towards the use of science in legal cases can be overcome. Important tools might be scientific training for lawyers/judges, focused interdisciplinary university curricula, and workshops like this one and others organised by BIICL. The third set of challenges identified during the discussions are related to substantive legal issues, such as causation, attribution, and remedies. The crucial importance of progress in attribution science was highlighted, both in terms of 'source attribution' and 'extreme event attribution.' Another challenge is to further develop scientific data on what is the fair share of each state in global emissions to keep within the agreed temperature goal ('effort-sharing' or 'equity'), and to ensure lawyers' access to such data. Finally, to further enhance the crucial role of science in human rights-based climate cases, more data is needed to establish the seriousness of the risk of human rights harm resulting from climate change, and to establish a causal link between emissions, climate change, and specific human rights violations, also on a country-specific basis. They concluded highlighting that the dialogue among the legal and scientific communities, which has already started to address those challenges, is expected to expand in the future, and eventually find the most effective answers to questions linked to the role of science in climate change litigation.

INSTITUTE OF LAW, POLITICS AND DEVELOPMENT

Sant'Anna School of Advanced Studies – Pisa

BIICL British Institute of International and Comparative Law

3CSA

International Workshop

The Role of Science in Climate Change Litigation

Integrated in the Seasonal School on Climate Change and International Law: Interdisciplinary Perspectives, Sant'Anna School of Advanced Studies (SSSA), Pisa

Online Event **14.00 - 18.30 (CET)**
14-15 July 2021 **13.00 - 17.30 (GMT +1)**

#ALL4 ITALY 2021 CLIMATE

Six years after the adoption of the Paris Agreement, and amidst new challenges posed by the Covid crisis, States' responses to climate change are still insufficient to keep the rise of global temperatures within acceptable and negotiated limits. Climate change litigation is rapidly spreading, with more than 1600 cases filed so far around the globe. Climate science often plays a crucial role in these legal cases, providing support evidence and helping to address issues such as 'attribution' and 'risk assessment'.

This Workshop aims to examine the current, and potential future role of science in climate litigation from two perspectives: that of climate scientists on the one hand, and that of legal experts and practitioners on the other. Such an interdisciplinary dialogue will contribute to improving participants' understanding of how science can help overcome current obstacles in climate change litigation, and how it can help courts to clarify existing legal obligations of States and private actors to prevent or respond to climate change.

Convenors:
Christine Bakker (SSSA, BIICL), Roberto Buizza (SSSA, 3CSA)
Ivano Alogna (BIICL), Jean-Pierre Gauci (BIICL)

THE ROLE OF SCIENCE IN CLIMATE CHANGE LITIGATION

Pisa, Italy, 14 & 15 July 2021

14.00 – 18.30 (CET, Pisa) / 13.00 – 17.30 (GMT+1, London)

PROGRAMME

Please note: hereafter time indicated in CET, Pisa

DAY 1: WEDNESDAY 14 JULY

14.00 – 14.15 WELCOME ADDRESS
***Sabina Nuti**, Rector, Sant'Anna School of Advanced Studies (SSSA), Pisa, and **Spyros Maniatis**, Director BIICL, London, United Kingdom (UK)*

14.15 – 14.25 SEASONAL SCHOOL ON CLIMATE CHANGE AND INTERNATIONAL LAW: INTERDISCIPLINARY PERSPECTIVES
***Francesca Capone** Assistant Professor of International Law, SSSA*

14.25 – 14.35 THE COP 26 UNIVERSITY NETWORK UK
***Alyssa Gilbert**, Director of Policy and Translation, The Grantham Institute for Climate Change, Imperial College, London, UK*

14.35 – 14.50 INTRODUCTORY REMARKS
***Roberto Buizza**, Professor of Physics, SSSA, and Director, Center for Climate Change studies and Sustainable Actions (3CSA) and **Christine Bakker**, Visiting Lecturer, SSSA, and Visiting Research Fellow, BIICL*

14.50 – 15.00 CLIMATE CHANGE LITIGATION AND SCIENCE: SETTING THE SCENE
***Jean-Pierre Gauci,** Arthur Watts Senior Research Fellow in Public International Law, BIICL, and **Ivano Alogna**, Arthur Watts Research Fellow in Environmental and Climate Change Law, BIICL*

15.00 – 16.00 ***FIRST PANEL:*** **PERSPECTIVES FROM CLIMATE SCIENCE**

*CHAIR: **Christina Voigt**, Professor of Law, University of Oslo, Norway, and Steering Committee Member of the IUCN-WCEL*

Climate Science: Where do we stand today?
***Filippo Giorgi**, Director, Earth System Physics Section, International Center for Theoretical Physics (ICTP), Trieste, Italy*

The integration of climate science in national and international climate policies
***Martin Siegert**, Co-Director of the Grantham Institute – Climate change and Environment, Imperial College, London, UK*

Attribution of climate change-related harm to individual States or private companies
***Myles Allen**, Professor of geosystem science, Oxford University, UK*

16.00 – 16.30 Discussion

16.30 – 17.00 Coffee break

(Day 1 – Continued)

17.00 – 18.00 ***SECOND PANEL*: PERSPECTIVES FROM LAW: CROSSCUTTING ISSUES**

CHAIR: ***Mario Martina****, Professor of Hydrology and Risk Management, Scuola Superiore IUSS Pavia; 3CSA*

Main trends in the use of science in climate change litigation – General insights
Joana Setzer*, Professorial Research Assistant, Grantham Institute for Climate change, London School of Economics, UK*

The use of science in human rights-based climate change litigation
Annalisa Savaresi*, Associate Professor in International Environmental Law at the University of Eastern Finland and Senior Lecturer in Environmental Law, University of Stirling, UK*

The impact of science on corporate due diligence related to climate change
Jason Reeves*, Managing Partner, Zelle LLP, London, UK, and* ***Deepa Sutherland****, Senior Associate, Zelle LLP, London, UK*

18.00 – 18.30 Discussion

DAY 2: THURSDAY 15 JULY

14.00 – 15.00 ***THIRD PANEL*: THE ROLE OF SCIENCE IN NATIONAL CLIMATE LITIGATION**

Chair: ***Sarah Mead****, Legal Associate, Climate Litigation Network, and Climate Litigation Project Co-Coordinator, WCEL Climate Change Specialist Group, IUCN*

The role of science in climate change litigation in the Global South
Jolene Lin*, Associate Professor at the National University of Singapore's Faculty of Law, Singapore*

The role of science in determining the adequacy of States' mitigation efforts: Lessons from the Dutch *Urgenda Case*
Dennis van Berkel*, Legal Counsel to the Urgenda Foundation and Director of the Climate Litigation Network*

The role of science in climate change litigation in the United States
Daniel Metzger*, Climate Law Fellow, Sabin Center for Climate Change Law, Columbia University, New York, USA*

15.00 – 15.30 Discussion

15.30 – 16.00 Coffee break

(DAY 2 – Continued)

16.00 – 17.00 ***Fourth Panel*: The Role of Science in International Environmental and Climate Change Litigation**

Chair: ***Antonio Navarra***, *Director, Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC), Bologna, Italy; Professor, Meteorology and Climatology, University of Bologna*

The role of science in environmental cases before the International Court of Justice
Sandrine Maljean-Dubois, *Senior Researcher at the Centre national de la recherche scientifique (CNRS), Professor of international and environmental law, Aix-Marseille University (France)*

The role of science in climate change cases before European courts
Marc Willers QC, *Garden Court Chambers, London, UK*

The role of science in climate-related cases before the UN Human Rights Committee and the Inter-American Court of Human Rights
Monica Feria-Tinta*, Barrister, Twenty Essex, London, UK*

17.00 – 17.30 Discussion

17.30 – 18.30 ***Concluding Discussion*: The Evolving Role of Science in Climate Change Litigation**

Chair: ***Roberto Buizza***

Panelists: ***Christina Voigt, Mario Martina, Sarah Mead, and Antonio Navarra,***

Climate Change Litigation and Science: Connecting the dots (Final Remarks):

Ivano Alogna, Christine Bakker and Jean-Pierre Gauci