



# The International Charter Space and Major Disasters NEWSLETTER

October 2023 Issue



Activations on map



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## UK Space Agency – Charter Leadership

The UK Space Agency took the responsibility of the Charter leadership in April 2023.



## Médecins Sans Frontières - Satellite data: A Vital Tool to Respond to Humanitarian Emergencies

The International Charter Space and Major Disasters provided vital support in the aftermath of the earthquakes in Türkiye and Syria.



## EnMAP Satellite: Enhancing Response to Somalia's May 2023 Flood Event

Floods makes up a significant portion of the Charter activations.



# SATELLITE DATA TO SUPPORT DISASTER RESPONSE WORLDWIDE

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## UK Space Agency – Charter Leadership

UK Space Agency took the responsibility of Charter leadership from Korea Aerospace Research Institute (KARI) in April 2023. The UK Space Agency organised the 49<sup>th</sup> meeting of the International Charter 'Space and Major Disasters' in Edinburgh, Scotland, UK. This was the first in-person meeting of the Charter since April 2020, due to the COVID-19 outbreak.

During the UK Space Agency leadership period there was the following activity:

- 33 Calls and 28 Activations
- Across 24 countries
- Averaging at around one activation a week
- 271 Value-Added Products uploaded so far
- 6,330 data products, 9,816 metadata.

As per the Charter's rotation policy, the leadership of the Charter changes every six months. European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) and the Canadian Space Agency (CSA) will take over as the next leads following UK Space Agency's lead period, beginning in October 2023.



*The Charter membership at the ECCL in Edinburgh in April 2023*

The Charter's membership pledge uses our collective resources to provide satellite data and assistance to countries who need it in the event of a major disaster. The service runs 24/7 and at no cost to the user. Through systems and services, we make satellite data available to emergency responders. This humanitarian service saves lives, livelihoods and infrastructure and relies on the best efforts of its members to succeed, and succeed it has. With over 836 activations to date the Charter continues to support those in need.

A report published in May by the World Meteorological Organisation (WMO) highlighted that the number of weather-related disasters has increased five-fold over the last 50 years, with the economic toll up by a factor of eight. While these events are becoming more frequent, and the impacts more wide-reaching, improvements in early warning systems and disaster management also mean that less people are losing



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their lives due to disasters. Initiatives such as the Charter, alongside organisations such as UN-SPIDER - UN Platform for Space-based Information for Disaster Management and Emergency Response; and Sentinel Asia, are utilising Earth Observation (EO) data to support emergency responses to help vulnerable communities across the globe.

Although the Charter relies on the 'voluntary best efforts' of its members, you will not meet a more dedicated group of individuals who, through consensus, keep pushing this initiative forward with enthusiasm and commitment. The members meet every six months to reflect on progress and set direction for the next period, to ensure that this vital service continues to deliver.

In April 2023 the UK Space Agency hosted the Charter membership at the Edinburgh Climate Change Institute (ECCI) at the University of Edinburgh. This was the first time the membership had held an in-person meeting for 3.5 years. There were new members to welcome and old friends meeting again after an absence. What defines this collective is a sense of duty to the global community where politics can truly be left at the door. It has been mentioned before that borders disappear when we look down on the Earth from space, but never has this felt more true than during the meetings held at the ECCI over those five days in Edinburgh. It was truly a privilege to host the membership in the UK, and to take on the leadership of this important initiative.



*Discussing the Charter at the GLOC (left) and at UN-COPUOS (right).*

Alongside hosting the membership at the ECCI the UK Space Agency also arranged a student outreach event for students from the University of Edinburgh, alongside the Space Sector Business Development Lead at University of Edinburgh, Kristina Tamane. In May, the UK Space Agency highlighted the work of the Charter at the first Global Space Conference on Climate Change (GLOC), organised by the International Astronautical Federation, through a panel session which explored the role of space agencies and the Charter in supporting disaster responses globally. In June, the UK Space Agency also hosted a side event at the plenary session of the UN Committee on the Peaceful Uses of Outer Space (UN-COPUOS) alongside UN-SPIDER and Sentinel Asia to explore the concept of Universal Access, the principle which allows any country to request a Charter activation, regardless of whether they are an authorised user. Both events were well received and provided an opportunity to share the important work of the Charter with a new audience.

Over the six months of the UK's leadership period, the UK Space Agency has been responsible for coordinating all charter activations and making sure the right people get the right data in their hour of need, but behind us will always be the powerful collective which make up the Charter membership.



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## Médecins Sans Frontières - Satellite data: A Vital Tool to Respond to Humanitarian Emergencies



*In Idlib Governorate, MSF offers water and sanitation activities in 18 camps for displaced population. On this image, children are having access to clean water.*

*Credit: Médecins Sans Frontières*

As the world mobilized to save lives in Türkiye and Syria in the aftermath of February's catastrophic earthquakes, behind -- or above -- the scenes, satellites peered down from on high, scoping out where crucial aid was needed most.

These damage assessments are a vital tool for organizations like Médecins Sans Frontières (MSF), which responded from the first hours of the disaster. Satellite imagery allows decision-makers to pinpoint areas most affected and deploy resources accordingly, as well as identify a safe route to get there, avoiding deadly delays where debris has made roads impassable.

The 7.8-magnitude and 7.6-magnitude earthquakes struck Türkiye and Syria on 6 February 2023. They were among the deadliest in a century: more than 56,000 people were killed, and millions more were injured or left homeless.

In hard-hit northwestern Syria, MSF was able to support dozens of hospitals and clinics with doctors, ambulances, various medical supplies, a maternity ward, and mental health counselling. It also distributed food, fuel, shelter materials, non-food items and clean drinking water. In neighboring Türkiye, it supported various local Non-Governmental Organizations (NGO) and Civil Society Organizations.

This was the first time MSF has participated in the Charter's operations, and according to Earth Observation (EO) specialist Leslie Jessen, satellite imagery primarily from Pléiades-1, WorldView-2 and WorldView-3 offered an overview of a vast area that would've been impossible to cover on the ground by car, because of potential earthquake debris and the ongoing conflict in the region. Jessen says it helped MSF "organize, mobilize, and prioritize" its efforts.



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When the Charter is activated, participating space agencies provide free satellite images, which experts compare to previous imagery, side-by-side, searching for damaged buildings, blocked roads, or tents -- signs of makeshift camps where those displaced are gathering, in need of urgent medical care or food and water.



*In Idlib Governorate, MSF offers water and sanitation activities in 18 camps for displaced population. On this image, MSF is providing installation of water tanks.*

*Credit: Médecins Sans Frontières*

MSF contributed as a Value Adder by making its detailed analysis available to others who needed it. To speed up this process, the Charter also offers training so analysts can learn about the full suite of tools at their disposal, and provide what Jessen calls a “quick and effective analysis with less of a learning curve.”

Beyond the initial impact, satellites are also shedding light on the longer-term effects on local geography. For example, the tremor has left several hillside communities vulnerable to landslides.

Already, the technology is delivering clear results for those in the field. Yolanda Vazquez, now a Flying Geographic Information Systems specialist for MSF, was stationed in the region at the time, and says satellite data is a vital tool. She’s confident it will “revolutionize the response of NGOs to humanitarian emergencies” by “empowering [them] to make informed choices.”

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## EnMAP Satellite: Enhancing Response to Somalia's May 2023 Flood Event

Amidst the catastrophic events of May 2023, Somalia faced a dire crisis as an unprecedented flood engulfed the nation, leaving widespread devastation in its wake and disrupting the lives of local communities.

In this challenging context, the International Charter: Space and Major Disasters (the Charter) emerged as a crucial cornerstone in response efforts during the distressing episode of flooding that gripped the nation. Through collaborative efforts, the Charter played a pivotal role in rapidly disseminating satellite imagery and data gathered from a coalition of global space agencies, including the German Aerospace Center (DLR). This collective endeavor proved instrumental in providing essential information for meticulous damage assessment, informed decision-making, and the efficient coordination of disaster response initiatives.

As a result, the cumulative impact of these efforts was a tangible reduction in the adverse effects of the flood on the vulnerable communities caught in its path. This demonstrated the power of international collaboration and technology in mitigating the impact of such crises.

Additionally, the EnMAP satellite emerged as a remarkable asset in disaster management due to its extraordinary hyperspectral imaging capabilities. This cutting-edge technology allows EnMAP to capture an extensive array of wavelengths, providing insights into a diverse range of materials and entities with exceptional precision. This capacity is of profound significance within the scope of the International Charter: Space and Major Disasters, facilitating accurate assessments of disaster-affected regions.

Looking ahead, EnMAP's role in addressing future natural disasters remains pivotal. Its advanced hyperspectral imaging capabilities enable detailed insights into changes on Earth's surface, offering early detection, assessment, and monitoring of events such as wildfires, floods, and landslides. This technological advancement enhances the comprehension of disaster patterns and supports effective responses, contributing to a more resilient and prepared global community.

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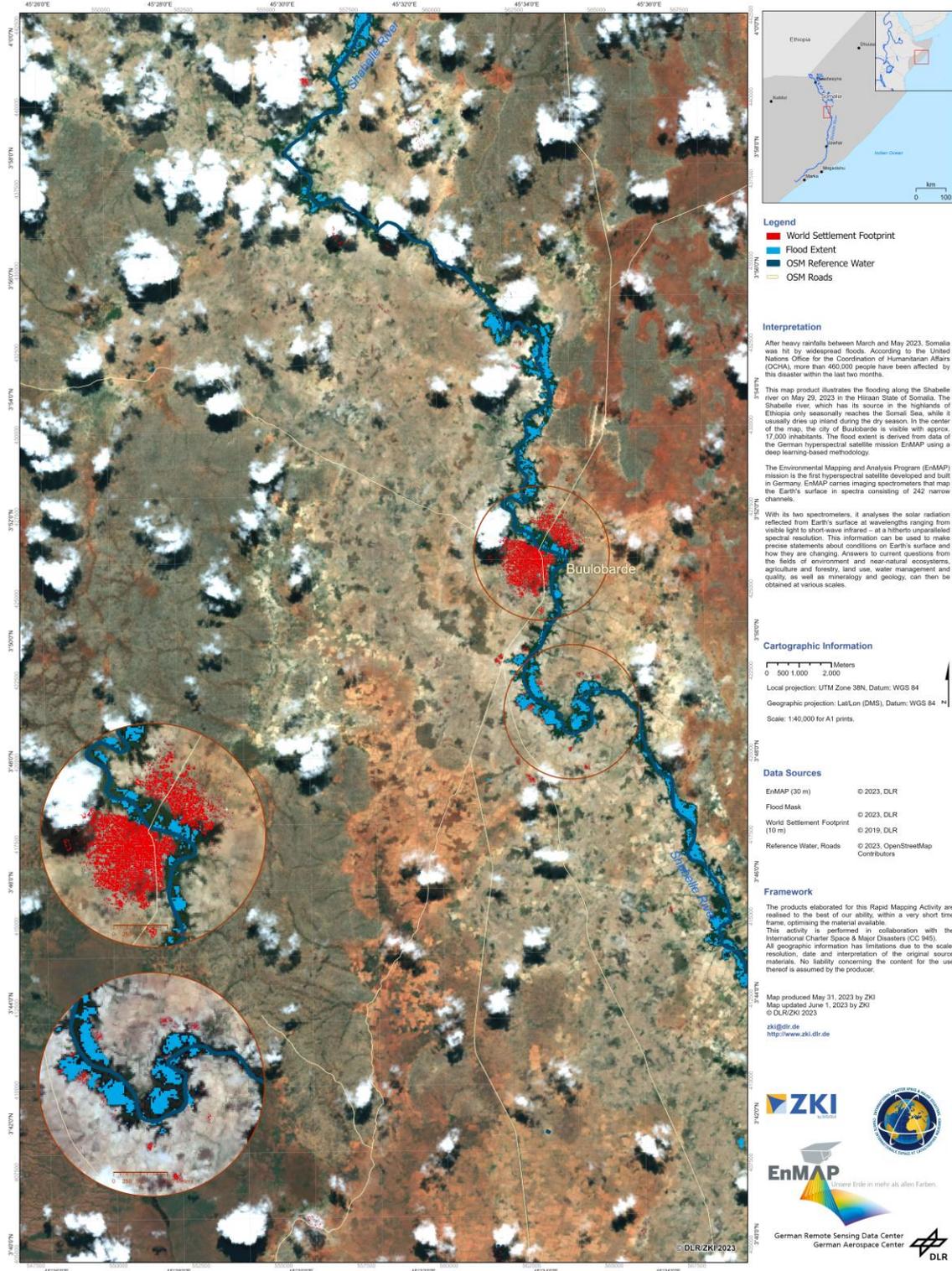


## SOMALIA - Shabelle River

Flood as of May 29th, 2023 - Overview Map

1:40,000

ZKI Activation No. 04  
Product No. 01  
Version No. 01





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## Charter Mapper Technical Meeting and Workshop Organized by ESA and LIST, Hosted by UNITAR in Geneva, Switzerland

A workshop dedicated to online geoinformation retrieval using Earth Observation (EO) data was organized by the Luxembourg Institute of Science and Technology (LIST) and the European Space Agency (ESA) and hosted by the UN at the United Nations Institute for Training and Research (UNITAR) premises in Geneva, Switzerland on the 27<sup>th</sup> of June 2023. The event gathered EO application specialists from SERTIT (France), DLR (German Space Agency), Terradue (Italy), ARGANS (UK), and UNITAR/United Nations Satellite Centre (UNOSAT), alongside ESA representatives from the International Charter.



Representatives from the UNITAR office in Bangkok were also present virtually. The purpose was to discuss new EO techniques to be implemented in the operational platform of the Charter Mapper, the online processing environment in operations since September 2021. In particular, the specialists shared experience and agreed on priorities concerning EO processing techniques for flooding, landslides, and earthquake response using the Optical and Radar missions of the Charter virtual constellation. The Charter Mapper is embedded in the operations workflow management system: COS-2. It provides seamless access to data and processing capabilities, allowing for both systematic and on-demand processing. The users of the system are Charter Project Managers and Value-Add Providers. In addition, the expert team discussed the geospatial content to be made available on the Training Processing Environment (PE). The Training PE is the instance of the Charter Mapper held outside of active Charter operations and is dedicated to capacity development (i.e. the training of new value adders and project managers). This instance can also be used to test possible applications of the processing services and GIS tools.

The agencies present provided comments on specific services and methods used in the Charter Mapper. On the topic of earthquakes, ARGANS presented the work done in the Charter Mapper for Charter Activation 797: Earthquakes in Türkiye. The use of the Coherence and Intensity Composite service



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combined with the Co-located Stacking service to identify broad areas of damage (i.e. city scale) was presented. On the topic of landslides, Terradue presented work done in the Charter Mapper for activations 794: Landslide in Colombia and 789: Tropical Storm Nalgae in the Philippines. The use of the new GIS functions to generate the contour of the landslide was presented. UNOSAT noted that they have tested the Normalized Difference Vegetation Index (NDVI) difference method using the STACK service to identify landslide contours with good results. Now with the release of version 1.8 of the Charter Mapper, these services are chained together in the NDVI Change Detection service. When using the k-means Classification service, UNOSAT noted the service provided good results however it could be useful to augment this service to allow for supervised classification and a selection of possible classes (e.g. clouds, trees, water). On the topic of flooding, LIST presented various applications of its HASARD flood mapping service integrated in the Charter Mapper. Also included in the flood presentation was the addition of a new auxiliary product in the Charter Mapper: the height above nearest drainage (HAND) dataset.

Overall, the meeting was productive in gathering feedback for the advancement of the Charter Mapper platform, and continuing the collaboration between the Charter, the UN, and Value-Added Providers. Ensuring Value Added Providers are aware and educated on the capabilities of the Mapper will allow them to provide the best possible service to the Charter. Collaboration with the UN allows for the expansion and strengthening of the user base, with the goal of granting more countries Authorized User status, as well as maintaining and informing the current users of the growing capabilities of the Charter. The Charter Mapper team will consider the comments of the attendees when determining priorities for the development of the platform.





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## Project Manager Training in Indonesia - organized by JAXA and BRIN

The National Research and Innovation Agency (BRIN) is an active member of Sentinel Asia, a framework to supply the earth observation data for the disasters in Asia-Pacific region. The scope of research at BRIN is wide-ranging, including the reduction of disaster risks associated with riverine floods, earthquakes, tsunamis, and storm surges in Indonesia.

In 2021, BRIN was launched by merging research institutes under Indonesian ministries, including the National Institute of Aeronautics and Space of Indonesia (LAPAN) and the Agency for the Assessment and Application of Technology Indonesia (BPPT), both of which are long-time members of Sentinel Asia. Inheriting the roles of LAPAN and BPPT, BRIN sometimes work as a Project Manager on International Charter: Space and Major Disasters (the Charter) activations.

On 12th July 2023, BRIN, with the support of the Japan Aerospace Exploration Agency (JAXA), organized Project Manager Training at the BRIN Office in Jakarta, Indonesia. In addition to the participants from BRIN, they also invited the National Disaster Management Agency (BNPB) and ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre) for the training, and 21 people participated in total.



The training started with opening remarks by Prof. Dr. Erna Sri Adiningsih, Executive Director, INASA, BRIN, and the participants learned about how the Charter works and the role of a Project Manager at the Charter activations, including the introduction to the Charter operation system COS-2. The European Space Agency (ESA) joined the training and lectured on the Charter Mapper, the Charter's newly introduced processing environment. They also deepened their understanding of the Charter and Sentinel Asia.

How the Charter Works

<https://disasterscharter.org/web/guest/how-the-charter-works>

Sentinel Asia

<https://sentinel-asia.org/index.html>

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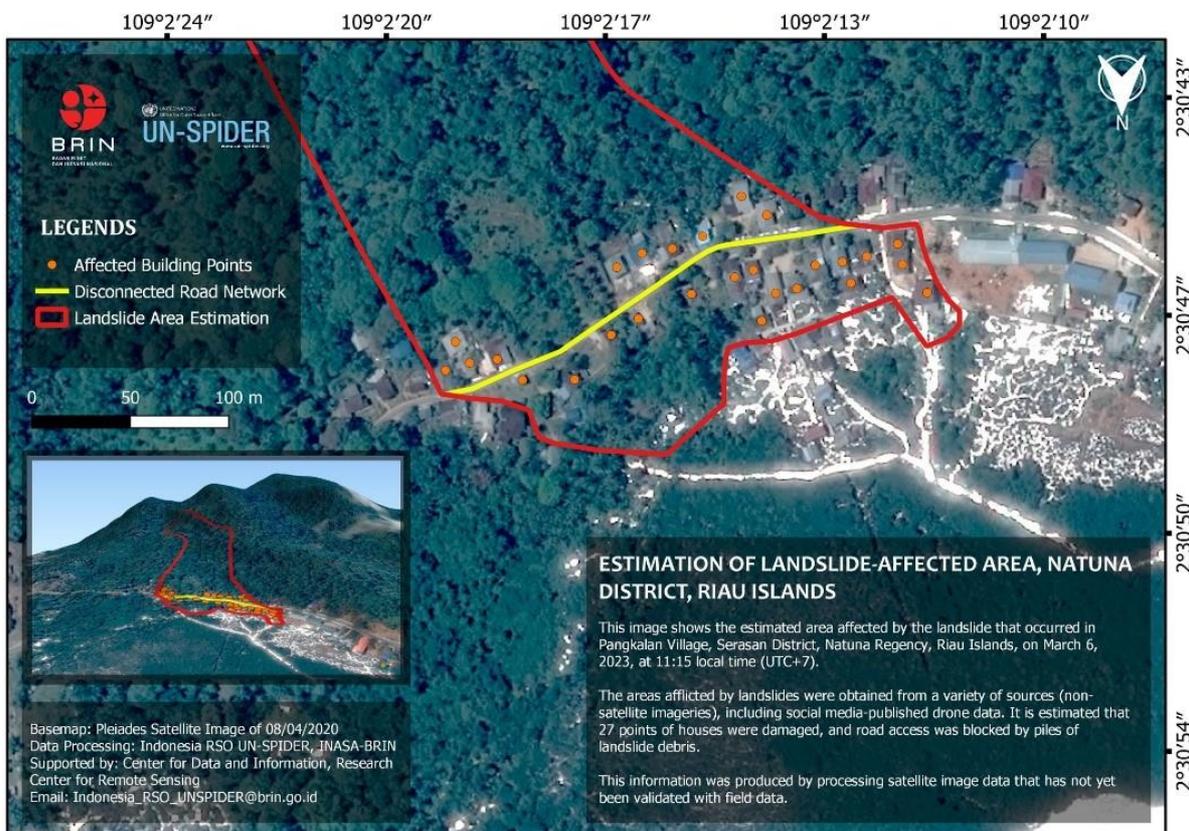
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*A Value Added Product produced by BRIN for a landslide in Indonesia, 06 March, 2023*



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## The Natural Hazards Partnership – A Story of Collaboration

### Introducing the Partnership

The Natural Hazards Partnership (NHP) is a consortium of 22 government departments and agencies, trading funds and public sector research establishments and bodies. The NHP builds on the interdisciplinary expertise and in-kind support of its partners to deliver better-coordinated natural hazards science, research and advice to UK Government, the Devolved Administrations of Scotland and Wales and to those public sector bodies with responsibilities for natural hazard resilience and response.

### NHP Partners and Responsibilities

Organisation	Role Description
<b>British Geological Survey (BGS)</b>	A world-leading geological survey. It focuses on public-good science for government, and research to understand earth and environmental processes.
<b>British Red Cross (BRC)</b>	Provides guidance to help prepare for an emergency, such as a storm, flood or heatwave and on what to do before, during and after an extreme weather event.
<b>Cabinet Office (CO)</b>	Supports the Prime Minister and ensures the effective running of government. It is also the corporate headquarters for government, in partnership with HM Treasury, and it takes the lead in certain critical policy areas.
<b>UK Centre for Ecology &amp; Hydrology (UKCEH)</b>	A world-class research organisation carrying out excellent environmental science across water, land and air to inform policy-making, commercial innovation and conservation action around the world.
<b>Department for Environment, Food &amp; Rural Affairs (DEFRA)</b>	The UK government department responsible for safeguarding our natural environment, supporting our world-leading food and farming industry, and sustaining a thriving rural economy. Its broad remit means it plays a major role in people's day-to-day life, from the food we eat, and the air we breathe, to the water we drink.
<b>Department for Transport (DfT)</b>	Works with other agencies and partners to support the transport network that helps the UK's businesses and gets people and goods travelling around the country.
<b>England and Wales Wildfire Forum (EWWF), designated to also represent wildfire communities of Scotland and Northern Ireland on the NHP</b>	Voluntary strategic body, independent of government, created to expand knowledge and understanding of wildfire, with the overall purpose of reducing the harmful impact of wildfires by promoting joint working and collaboration.
<b>Environment Agency (EA)</b>	Works to create better places for people and wildlife, and support sustainable development.
<b>Government Office for Science (GOS)</b>	Ensures that government policies and decisions are informed by the best scientific evidence and strategic long-term thinking.



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<b>Health and Safety Executive (HSE)</b>	Britain's national regulator for workplace health and safety. It aims to reduce work-related death, injury and ill health. It does so through research, information and advice, promoting training; new or revised regulations and codes of practice, and working with local authority partners by inspection, investigation and enforcement.
<b>Met Office (MO)</b>	The UK's National Weather Service. It provides weather and climate-related services to the Armed Forces, government departments, the public, civil aviation, shipping, industry, agriculture and commerce.
<b>National Centre for Atmospheric Science (NCAS)</b>	World leading research centre, funded by the Natural Environment Research Council and dedicated to the advancement of atmospheric science
<b>National Oceanographic Centre (NOC)</b>	The UK's national centre of excellence for large scale oceanographic research.
<b>Natural Environment Research Council (NERC)</b>	The leading funder of independent research, training and innovation in environmental science in the UK.
<b>Natural Resources Wales [Cyfoeth Naturiol Cymru] (NRW)</b>	Ensures the environment and natural resources of Wales are sustainably maintained and used, now and in the future.
<b>Network Rail (NWR)</b>	Owns, operates and develops Britain's railway infrastructure.
<b>Ordnance Survey (OS)</b>	Great Britain's national mapping agency. It carries out the official surveying of GB, providing the most accurate and up-to-date geographic data, relied on by government, business and individuals. It is a government owned company as well as a non-ministerial department.
<b>UK Health Security Agency (UKHSA)</b>	Executive Agency, sponsored by the Department of Health and Social care is responsible for protecting every member of every community from the impact of infectious diseases, chemical, biological, radiological and nuclear incidents and other health threats.
<b>Scottish Environment Protection Agency (SEPA)</b>	Scotland's principal environmental regulator, protecting and improving Scotland's environment. Scotland's national flood forecasting, flood warnings and strategic flood risk management authority.
<b>Scottish Government</b>	Has devolved responsibility for preparing and responding to natural hazards in Scotland.
<b>UK Space Agency</b>	Responsible for all strategic decisions on the UK civil space programme and provide a clear, single voice for UK space ambitions.
<b>Welsh Assembly Government</b>	Has devolved responsibility for preparing and responding to natural hazards in Wales.

## Origins

The Pitt Review, commissioned in the aftermath of the 2007 UK summer floods, determined that the UK system of providing advice on potential natural hazards, and ultimately delivering warnings, was too disjointed and scientific information was not translated appropriately into actionable and usable information. The Review recommended that resource integration between scientific organizations, governmental departments and emergency responders needed to be improved and highlighted the need for "a national framework to help reduce the risks to the delivery of essential services resulting from natural



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hazards". The response to the review initially led to the formation in 2011, of the Flood Forecasting Centre (FFC), a joint operational partnership between the Environment Agency (EA) and the Met Office.

Building on the success of the FFC, a feasibility project to investigate the collaboration opportunities for a broader 'all hazards' approach to disaster planning and mitigation was initiated and relatively quickly resulted in the birth of the NHP in 2011. The partnership initially comprised 13 public sector organizations and government departments, expanding to 17 partners by 2013 and with the addition of the England and Wales Wildfire Forum in 2023, to the present-day composition of 22 partners.

## How it works

The NHP's partners bring a huge range of public sector and scientific expertise, experience and natural hazard related monitoring, forecasting, warning and advisory service responsibilities to the partnership. This range facilitates the simultaneous undertaking of disaster risk reduction research in a number of scientific disciplines; improves the robustness of research via validation and review from a number of different perspectives; and helps to ensure that the NHP's offerings are understandable and relevant to its users.

The NHP does not receive direct funding and is dependent on the in-kind contributions of its partners. The partnership is underpinned by a Memorandum of Understanding between the partners which sets out the basic principles of collaboration and also maintains an operating plan that clearly defines the agreed priorities, activities and structures of the partnership. At an organizational level, all NHP partners are public bodies from within, or associated with a UK, Scottish or Welsh government department. This ensures that members already operate in a similar organizational environment and all are primarily working to improve public services. At the individual level, well-established working relationships have developed into strong personal relationships across the NHP.

## Evolution

The NHP has overcome the collaborative challenges of multiorganizational, geographically dispersed working by building common ground, respect and trust. This has allowed the development of strong leadership and inter-organizational coordination practices and created an agreed common approach to scientific research. These achievements have helped to ensure that the NHP produces valuable products, services and advice, a model which could be translated to other disciplines and communities of practice. The public body nature of the NHP means that it is well positioned to provide accessible advice to the UK's resilience community. The NHP's role is not to replace the responsibilities and accountability of existing public bodies, agencies and organizations, but to complement and enhance their current activities through multi-institutional working.

The partnership has gained international recognition with initial findings from the United Nations Office for Disaster Risk Reduction (UNDRR) facilitated peer review of the UK's approach to resilience, highlighting the NHP as a model "other nations may wish to adopt".

Close collaboration is particularly important in the NHP, where multiple projects of different scope and scale are underway simultaneously, each with its own focus and subset of project partners. Establishing communication across these projects has been important to ensure that work is not duplicated and that the scientific or technical methods used by different partners within a project do not conflict. With the importance of clarity and communication in mind, the NHP has evolved to a clear but very simple organizational structure.



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## NHP Governance Structure (2023)

### NHP Steering Group

Driving, assuring & overseeing the delivery of the NHP Operating Plan

#### NHP Management Team

(Chair, vice-chair, Sub-group chairs & vice-chairs, partner user rep(s), Sec)

Coordinating the development & delivery of the NHP Operating Plan

#### Hazard Impacts Science to Services Group (HIS<sup>2</sup>G)

Daily Hazard Assessment (DHA)

National Security Risk Assessments 'review & challenge'

Hazard information & guidance materials

Stakeholder/user outreach & comms

Continued development of NHP Hazard Impact Framework

Facilitation of hazard impact modelling & monitoring science collaboration

Identification of hazards science & monitoring capability gaps

All parts of the NHP organizational structure work in synergy to define direction and priorities. This ensures that work is done efficiently and to a high standard. The Steering Group is made up of senior representatives from each partner organization. The Steering Group is responsible for the NHP's strategic direction including development and delivery of the operating plan. The Secretariat supports the Steering Group and sub-groups by managing governance, funding and supporting the delivery of research and advice. The Hazard Science to Services sub-group (HIS<sup>2</sup>G) takes direction from the Steering Group and support from the Secretariat, to define, prioritize and coordinate activities for the development and delivery of scientific research, natural hazard information, and advice for target audiences.

### Products and services

The NHP is unique to many other national disaster risk platforms through its focus on impacts and its ambition to deliver expert, consistent, and coordinated advice, from a single source, across the entire UK disaster risk reduction community. The NHP focuses on the preparedness and planning elements and activities of the Disaster Management Cycle which means that the partnership focusses on:

- i. Supporting Governments in identifying individual partners and experts to be called upon to provide expert input both nationally and internationally including at the UK Government's Scientific Advisory Group for Emergencies (SAGE) committee;
- ii. Delivering a 'review and challenge' function as part of the Cabinet Office coordinated National Security Risk Assessment (NSRA) process. The scope of this work includes the identification of potential natural hazards for inclusion and assessment, the coordination of NHP partners to support lead government departments in developing robust 'reasonable worst-case scenarios' for natural hazards, and the provision of experts to independently review the natural hazard risks within the NSRA.;



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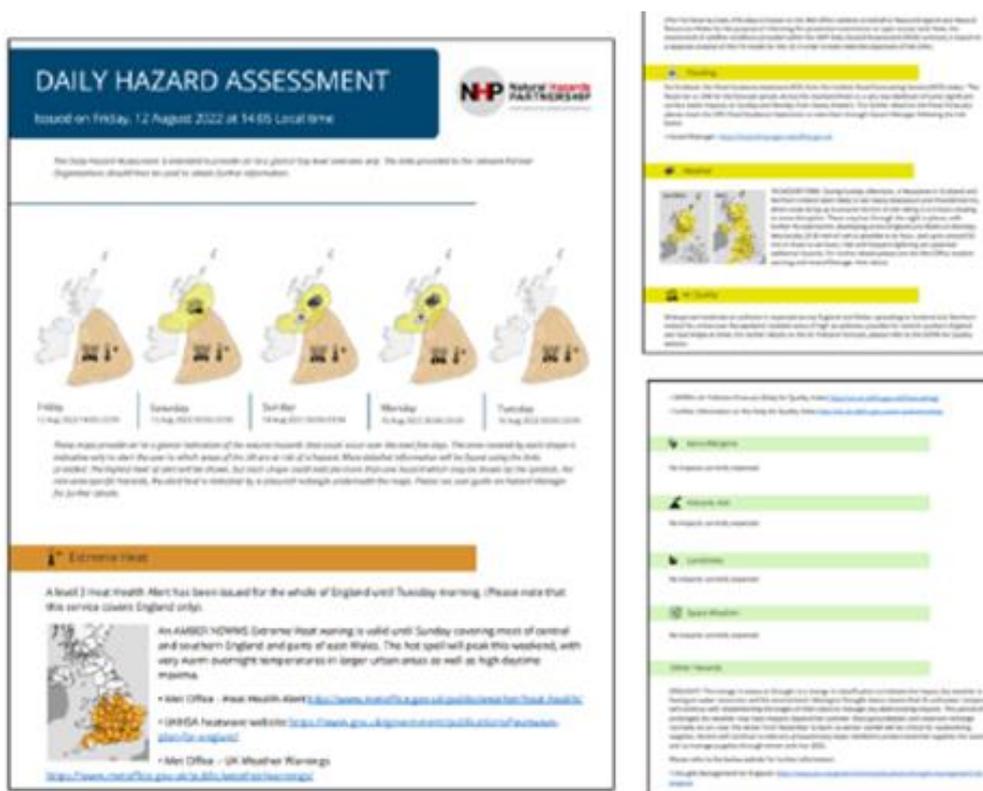


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- iii. Production of the Daily Hazard Assessment (DHA): An at a glance, 'one-stop-shop' overview of potential natural hazards that are expected to impact the UK over the following 5 days. The 'new' and enhanced DHA is due for rollout in autumn 2023 and as with its predecessor will be available to the resilience community on the Met Office Hazard Manager platform.



The DHA is the primary and most visible service coordinated and delivered by the NHP. NHP partners, responsible for the mandates or legislated warnings for each natural hazard, provide expert hazard warning advice and information for inclusion in the DHA to help increase the UK's resilience community's ability to respond to, and be prepared for, multihazard events by providing multi-hazard early warnings.

- iv. Development of Natural Hazard science notes and fact sheets: A series of short guides that provide additional hazard background information for each natural hazard, see example on next page. The notes, available from the NHP on request, provide generic information, signpost issues that are likely to be important, and provide links to more detailed information sources. They are supplemented by one page Hazard Overview fact sheets that provide key top-level information on the natural hazard and their potential impacts.
- v. The convening of a quarterly forum for Hazard Impact Modelling development across the participating organisations. The aim of the forum programme is to facilitate data sharing and computer model interoperability through the development of the NHP's Hazard Impact



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## Inland Flooding

This Science Note is one of a series of short guides covering a range of natural hazards. These guides aim to provide non-experts with a brief introduction to each hazard and to highlight key aspects that may need to be taken into account in decision-making during an emergency involving this hazard. They are not intended to be fully comprehensive, detailed analyses or to indicate what will happen on any particular occasion. Instead they will signpost issues that are likely to be important and provide links to sources of more detailed information.

### What is Inland Flooding?

Most inland flooding results when ground conditions inhibit water drainage after intense and/or persistent rainfall. The flooding can take several forms, over a wide range of space (or area) and time scales, and degrees of impact.

### How does Inland Flooding affect the UK?

There are several different physical processes which contribute to inland flooding in the UK:

**Surface Water** (pluvial) flooding occurs when intense rainfall overwhelms local drainage capacity. It can occur anywhere, and can be particularly disruptive in urban areas. It is most commonly associated with summer thunderstorms, where the effects can be very localised. But more extensive surface water flooding can occur at any time of year during extended wet periods in which the ground is saturated. While heavy rain is the dominant factor, surface water flood risk can be exacerbated by ground conditions that promote rapid run-off or prevent drainage: very wet ground, very dry and/or compacted ground, frozen ground or an abundance of concrete or other impermeable surfaces, blocked channels or uncleared trash screens. Another contributory factor is fallen leaves and tree debris during autumn, which can rapidly block drains and streams.

**River** (fluvial) flooding occurs when a river cannot adequately convey downstream the water flowing from surrounding land or other rivers. The excess water then spills onto a flood plain or other adjacent land. The speed at which a river's level and flow increases in response to rainfall depends largely on the size and shape of its catchment; small rivers can respond rapidly, on a timescale of a few hours or less, while peak levels and flows for major rivers such as the Thames or the Severn may only be reached several days after the rain has fallen. River or tidal flooding in estuaries can be more likely when tidal water levels are high, preventing river water from draining quickly into the sea.

**Groundwater** flooding is the emergence of ground water at the earth's surface. Groundwater is usually stored below the surface, often within layers of permeable rock



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Activations on map



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## In summary

Since its creation in 2011, the Natural Hazards Partnership has proved itself as a trusted and successful partnership for UK natural hazard disaster risk reduction. The NHP's focus and priorities distinctively position the partnership to assist the UK, Scottish and Welsh governments in aligning with the internationally agreed Sendai Framework. International organizations such as the United Nations Office for Disaster Risk Reduction, European Commission, Organization for Economic Co-operation and Development, World Health Organization, World Meteorological Organization are also acknowledging the role of the NHP and the importance of its work.

The NHP is unique in the global context. Other initiatives exhibit elements of the NHP; however, none demonstrate such a strong and wide-ranging national inter-organizational natural hazard “research-to-operations-to-responder” focus. This includes a comprehensive range of impact-based natural hazards information and advice aimed at stakeholders including national governments and the UK’s resilience and response community. These products and services have been demonstrated to successfully deliver a ‘one voice’ philosophy ensuring natural hazard advice is coordinated and consistently messaged across multiple communication channels.

Collaborative scientific research is one of the keystones and benefits of the NHP. The NHP is leading the way in moving from hazard-based to impact-based natural hazard research to better understand and forecast potential impacts. Impact-based forecasts are useful because they provide a ‘What does this mean to me?’ explanation resulting in improved understanding, preparedness and resilience. The NHP's hazard impact modelling forum is helping to answer this question. Innovative techniques are being used to assess likelihood and potential impact and the Hazard Impact Framework is looking to drive consistency and interoperability between multiple Hazard Impact Models.

Despite the NHP's success, the partnership faces a number of significant challenges. Central government ownership and a more resilient funding model (rather than the in-kind contribution of NHP partners) is needed to fully realise the potential of the NHP. As the partnership moves into its teenage years and the development of its next 4-year plan, it will be necessary to revisit its priorities and scope, membership and relationships, especially with its Government(s) stakeholders and maybe even with a more public audience to ensure that the NHP remains relevant and fulfils its undoubted potential over the coming years.

Ian Lisk  
Chair NHP (2013-present)

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## PM Training at UN-SPIDER Bonn July 18<sup>th</sup>- 20<sup>th</sup>, 2023

The training event was organized by UN-SPIDER, The University of Bonn, and The German Space Agency (DLR) and held at the Langer Eugen UN building in Bonn, Germany. Representatives from the International Charter, comprising of European Space Agency (ESA) staff and contracted agencies (Terradue and ARGANS) led the three-day training.

The meeting began on the 18<sup>th</sup> of June when attendees from six African nations, as well as Colombia, Austria, Sri Lanka, Belarus, and Germany arrived to attend the workshop. The attendees came from space agencies (e.g. National Space Research and Development Agency (NASRDA) and South African National Space Agency (SANSA), National Disaster Management Authorities (DMAs) (e.g. BNGRC, Madagascar) and previous Projects Managers (PMs) / Value Adders (VAs), (e.g. Center for Remote Sensing of Land Surfaces of Germany (ZFL – University of Bonn) and Geoinformation Systems (Belarus).



Figure 1: Training leaders commencing the meeting



Figure 2: Training groups working on the tutorials

Figure 3: A training group presenting their results

The first day focused on introductions, where the objectives of the Charter were presented by DLR and the role the UN plays as a cooperating body in Charter activations was presented by UN-SPIDER. A brief introduction to the Charter Mapper was given by Terradue and relevant information concerning the duties of the PM in Charter activations was presented by ESA. The second day started with a presentation by ARGANS of a variety of Charter Mapper use cases for each hazard type. After this



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presentation, the participants were divided into working groups based on their thematic backgrounds to perform hands-on training. Use cases were selected and a follow-along tutorial document was provided to each group, starting with basic visualization and moving to advanced processing. The five groups were organized as follows, with the participant's countries in parenthesis.

**Group 1:** Southern Africa (Eswatini, Madagascar, South Africa, and Germany)

Use Case: Cyclone Freddy in Madagascar (Act-812)

**Group 2:** Western Africa (Nigeria, Austria, and Germany)

Use case: Flooding in Nigeria (Act-777)

**Group 3:** North-Western Africa (Algeria, Colombia, and Germany)

Use Case: Wildfire in Tunisia (Act-766)

**Group 4:** Northeastern Africa (Ethiopia, Sri Lanka, and Germany)

Use case: Flooding in Nigeria (Act-777)

**Group 5:** Europe (Belarus and Germany)

Use case: Earthquakes in Türkiye (Act-797), Tropical Storm Nalgae in the Philippines (Act-789)

Before the groups began working, the use cases and tutorial documents were introduced so the groups understood the objective of the training. The tutorial documents were designed so that the groups could gradually learn the functions of the Mapper, starting from basic visualization and moving to advanced processing. The groups worked on their specific use cases with the guidance and assistance of the training leaders (ESA, Terradue, and ARGANS). The second day concluded with the groups finishing the visualization steps, such as the modification of the histogram for individual images and the creation of on-the-fly image composites. Some groups completed basic processing, such as the utilization of the HASARD or BAS services.

The beginning of the third day was dedicated to finishing the processing steps in the tutorials, The fire and landslide groups utilized the NDVI-CD service to generate a vector contour of their respective thematic hazard, while the flood groups combined the STACK, HASARD, and filter vectorize services to generate a vector contour of flooding over a specific land cover type (e.g. cropland). Upon completing their respective thematic tutorials, the groups were given time to prepare a short presentation of their results and feedback from their experience. The groups then presented their results to the organizers and other participants, showing that the training was successful as all groups were capable of generating useful results within the mapper. The last part of the third day was dedicated to discussion where the participants asked final questions as well as giving their feedback, consisting of both positive feedback and suggestions for improvements.

Following the training, the participants were urged to contact the Charter to create a PM account if they do not have one already. This will allow them to access the Charter Mapper training platform to continue practicing using the Charter Mapper before a potential future disaster occurs. Doing this will avoid losing valuable time during a disaster scenario, as they will already have an account and be familiar with the platform for either visualizing and selecting data or performing processing.