

**Minutes of the 6 Expert Panel on Natural Hazards – Meteorological and Coastal Flood Hazards Sub-Panel  
Held on 25 February 2021 via Microsoft Teams**

**Present:**

Dr Aidan Parkes (AP) – ONR External Hazards Inspector (Chair)  
 Andria Gilmour (AGi) – ONR Professional Lead for Civil Engineering and External Hazards  
 Richard Fowler (RF) – ONR External Hazards Principal Inspector  
 Tom Ives (TI) - ONR External Hazards Inspector  
 Andrew F Preece (AFP) – ONR External Hazards Inspector  
 Rachel Curtis (RC) – ONR External Hazards Inspector  
 Alex Edey (AE) – ONR External Hazards Inspector  
 Sarah Brown (SB) – ONR Policy and Communications  
 Prof. Stephan Harrison (SH) – Expert Panel member  
 Prof. Kevin Horsburgh (KH) – Expert Panel member  
 Dr Alan Gadian (AG) – Expert Panel member  
 Paul Sayers (PS) – Expert Panel member  
 Andy Mayall (AM) – Environment Agency (EA)  
 Sam Kipling (SK) – Environment Agency (EA)  
 Dr Sue Manson (SM) – Environment Agency (EA)  
 Dr Julie Bregulla (JB)– British Research Establishment (BRE)  
 Dr Will Lang (WL) – Met Office (MO)  
 Alice Walker (AW) – Expert Panel on Natural Hazards (Secretariat)

**Agenda**

Serial	Timing	Item Description	Introduced
<b>Thursday 25 February 2021 – Teams Meeting</b>			
	09:15 – 09:30	Gathering (Teams link commences 09:15)	
<b>1</b>	<b>09:30 – 09:45</b> 09:30 – 09:45	<b>Welcome, Introductions and Update</b> Welcome and update on activities from ONR	AP
<b>2</b>	<b>09:45 – 10:45</b> 09:45 – 09:55 09:55 – 10:10  10:10 – 10:20 10:20 – 10:35  10:35 – 10:45	<b>Meteorological &amp; Coastal Flood Hazards</b> UKCP18 – update from ONR & EA UKCP18: enhancements, and new products and services  TAG13 Annex 2 and 3 EP Papers - Update Project Speed and Planning White Paper - Update Discussion	RC/SK WL  KH/SH SK  All
	10:45 – 10:55	Break	
<b>3</b>	<b>10:55 – 12:40</b> 10:55 – 11:15 11:15 – 11:30  11:30 – 11:45 11:45 – 12:00  12:00 – 12:15 12:15 – 12:30  12:30 – 12:40	<b>Meteorological &amp; Coastal Flood Hazards</b> Sea level rise - Antarctic Ice Projections Gaps in groundwater flood risk with climate change - recommendations from our non-stationarity work  Coastal infrastructure and climate change Arctic climate change and mid latitude teleconnections Probable Max Precipitation in the UK Update on Eurocode developments under Mandate M/515 Discussion	KH SM  PS SH  AG JB  All
<b>4</b>	<b>12:40 – 12:50</b>	<b>Meteorological &amp; Coastal Flood Hazards</b>	

	12:40 – 12:50	Research Briefing Update	AP/AE
5	12:50 – 12:55	<b>Actions</b>	AW
6	12:55 – 13:05	<b>AOB – FOIs and NGO engagement</b>	All

## 1 ONR Update

KH will be leaving the Expert Panel (EP) to take up a position as Climate Science Lead with the Green Climate Fund. KH's hard work on the Panel and contributions to ONR's guidance were recognised.

In relation to [ONR's research projects](#), RRR-055 should be published soon and [RRR-059](#) is now available on the ONR web-site. For RRR-093, ONR has written a [paper](#) with Ralph Burton (Leeds University). Project RRR-079 is ongoing and the initial results were presented to the EP in 2020. The project is likely to continue for a further two years. Two further projects (RRR-059 – phase 2 and RRR-107), relevant to this sub-panel, are planned for the next financial year, and the EP will be engaged in this work. In relation to revision of ONR's External Hazards guidance, the EP presented updates to the EP papers under agenda item 2.

## 2 Meteorological and Coastal Flood Hazards - UKCP18 and TAG13

- ONR is in the process of updating, with the EA, the Principles for Flood and Coastal Erosion Risk Management to take account of UK Climate Projections 2018 (UKCP18). The use of UKCP18 is considered to be relevant good practice (RGP) in determining climate change allowances for relevant natural hazards at Great Britain (GB) licensed sites. ONR is continuing to engage with dutyholders on the application of UKCP18 as part of routine regulatory engagements and is seeing UKCP18 being incorporated into safety cases. The EP mentioned that several papers on the updated climate models from the Coupled Model Intercomparison Project 6 (CMIP6) have recently been published. The EP consider that CMIP6 is more realistic as it fits better with the paleoclimate record than CMIP5 and asked how CMIP6 would be taken into account in planned updates to ONR's guidance. The EP was asked to send relevant papers on CMIP6 to ONR. Following this, ONR would consider arranging a meeting to discuss CMIP6. **SH to send relevant CMIP6 publications to ONR (Action 1 / 6). Following Action 1/6, RC, SH and AP should consider a meeting to discuss how CMIP6 may be considered in planned updates to ONR's guidance (Action 2 / 6).**
- The UK Centre for Ecology and Hydrology (CEH) has been modelling current peak river flow allowances to better understand variation within river basin districts. The EA noted that all data will be published along with the [CEH research papers](#). The EA will use this information when updating the allowances (aiming for mid-2021) to ensure planning decisions are rigorous and defensible. They added that they are also involved in further related research that they expect to complete later this year. The EP's paper for RRR-055 on extreme weather events highlights the use of paleoclimate data to better assess contemporary events. The paper is currently going through ONR governance and will be shared with the EA when approved and published on the ONR web-site. **AP to send the RRR-055 paper to EA (Action 3 / 6).**
- An overview of the recent UKCP18 enhancements was considered and [fact sheets](#) on UKCP18 are available on the Met Office (MO) web-site. In addition, [a technical note](#) had been issued by the MO to address an error in the original UKCP18 Local 2.2km simulation data. The MO is in the process of developing a National Severe Weather Warning for Extreme Heat, which is due to be launched in summer 2021. **WL to send details of the National Severe Weather Warning for Extreme Heat when they become available (Action 4 / 6).**

- The update of Annex 2 EP paper is nearing completion and comments from Prof. Richard Betts at the MO will be addressed over the coming weeks. ONR has shared the Annex 3 EP paper for comment with other regulators including EA. **EA to provide comments to the ONR on the Annex 3 EP paper by 19 March or sooner (Action 5 / 6)**

### 3 Meteorological and Coastal Flood Hazards - Presentations

- The EP highlighted recent publications that focus on the biggest challenges related to sea-level rise. Research published in 2020 shows that ice-sheet mass changes have the largest effect on global and local sea-level predictions, and confirms that the largest uncertainty in Intergovernmental Panel on Climate Change (IPCC) estimates of future sea-level rise comes from quantifying the contribution from the Antarctic. Recent research is consistent with the guidance in both the Annex 3 EP Paper and the UKCP18 marine projections, both of which consider the potential additional contribution from the Antarctic Ice Sheet. A link to the [The UK Climate Resilience Programme](#) was shared.
- The EA reported that river flow records show a general increase in flood peaks. On average, across England and Wales, accounting for non-stationarity in flood frequency estimation makes little difference to estimating design flows. However, in individual cases, it can make a large difference often leading to an increase in present-day estimates. The EA has produced [guidance](#) on how to interpret and improve understanding of the issues. The UK is the first country in the world where practitioners have the tools and guidance to take account of non-stationarity on rivers. The EP confirmed that the UK is also unique among the countries examined in using the most up-to-date scientific advice from both UKCP18 and the CMIP5 climate models of IPCC AR5. ONR said that it may be useful to do a gap analysis in relation to the published Flood Estimation Handbook and the EA's current work. The EA added that the work is trying to improve understanding, develop techniques, and recognise limitations. Therefore, it is badged as interim at the moment. The EP encouraged the use of paleoclimatic data, as it is difficult to identify non-stationarity on a short data set of 50-60 years. The EA reported that they had used stations with 100 years of data. During the meeting a link to the EA's [previous work](#) on using palaeoflood and historical data was provided.
- The EP has included new material on the impact of climate change on coastal infrastructure in the recent update to the Annex 3 EP paper. The EP highlighted that waves arriving around much of the UK coastline are currently depth limited. Wave overtopping and wave energy is largely a function of water depth, and therefore, sea-level rise leads to an increase in wave energy arriving at the shoreline. For a single defence, for example, an embankment, climate change can impact the fragility of the infrastructure through its influence on various deterioration processes and by greater loadings resulting from increased water depth.
- The EP concluded that mid-latitude cooling in winter was probably not caused by Arctic sea-ice loss. Rather it is a consequence of complex regional circulation changes that precede and then simultaneously drive Arctic sea-ice loss and mid-latitude cooling. The importance of understanding model uncertainty was emphasised, as modelling does not capture all scenarios.
- The EP reported that Probable Maximum Precipitation (PMP) is still widely used, but Numerical Weather Prediction (NWP) models are providing new calculations of limiting values of PMP in different regions. In the next decade, estimation of PMP is likely to be more reliant on values developed by numerical modelling, although it will be subject to change in a warming world. Both the EA and Network Rail are currently engaged in

projects to better understand PMP. Post-meeting a link to the Met Office [project related to PMP](#) was provided.

- The Building Research Establishment (BRE), as part of their Structural Support Contract for the Ministry of Housing, Communities and Local Government (MHCLG) keep a watching brief over the Eurocodes and their UK mirror committees. The Eurocodes have been mandatory in the UK since 2010. A programme of review and update is underway, which started in 2013. The work (under Mandate M/515) covers items and updates across all existing Eurocode parts and also progresses with the development of some new parts (for example for the development of unified rules for the assessment of existing structures). Final votes on this evolution of Eurocodes are currently expected in October 2025. The approach to withdraw existing Eurocode parts thereafter is yet to be finalised and will be communicated in due course. The presentation highlighted to the committee ongoing work under the Eurocode Mandate on Climate Change. ONR will develop ways to take forward the synergies highlighted in the presentation; in particular, how the emerging science in meteorological and coastal flood hazards is influencing the engineering design of structures and how they are being interfaced with Eurocodes. **ONR to develop synergies with construction standardisation activities, specifically the Eurocode Mandate (Action 6 / 6).**

#### 4 Meteorological and Coastal Flood Hazards – Research Briefing

ONR explained the context and purpose of the Research Briefing, which is to provide more transparency on the research that they consider in its development of Regulatory Guidance. The panel advised the Research Briefing should describe the emerging science and the impacts of this on ONR’s guidance - agenda item 3 demonstrated the added value of this approach.

#### 5 Actions

No.	Action	Responsible
1 / 6	Send relevant CMIP6 publications to ONR.	EP
2 / 6	Consider a meeting to discuss how CMIP6 may be considered in planned updates to ONR’s guidance.	ONR, EP
3 / 6	Send RRR-055 to EA following ONR governance and approval.	ONR
4 / 6	Send details of the new National Severe Weather Warning for Extreme Heat due to be launched in the summer.	MO
5 / 6	EA to provide ONR with comments on Annex 3 EPP before 19 March.	EA
6 / 6	Engage with BRE on synergies.	ONR, BRE

#### 6 Any Other Business

No other business was raised