Assessing and Communicating Country Level Impacts of Climate Change in Russia and the UK

This bilateral project is strengthening Russia-UK research collaboration on strategic climate science, and increasing public awareness of significant climate impacts in Russia and the UK. The work is being delivered by the Institute of Global Climate and Ecology of Roshydromet and RAS (FSBI "IGCE") in Russia and the UK-based environmental consultancy Ricardo Energy & Environment. The State Hydrological Institute (Roshydromet) has also contributed to the Russian part of the assessment. This project builds on work done by Russia and the UK during the pilot phase of the UK-UNEP Country Level Impacts of Climate Change project (CLICC).

The purpose of the project is to develop and apply approaches for the assessment and synthesis of climate impacts at a national level in both countries to enable more consistent and transparent communication of key impacts and raise awareness of these among national and international stakeholders. For this project, Russia has focussed on assessing the magnitude of climate impacts on terrestrial permafrost. The UK has focussed on assessing the impacts of climate change on flooding.

Russian Assessment of Climate Change Impacts on Permafrost

The influence of climate change on natural systems, socio-economic sectors and human health is gradually becoming a topic of high interest in Russia, despite a certain degree of climate scepticism in society and in some parts of the Russian business community. In the last decades, the non-scientific community has begun to realise the possible threats from climate change and has thus started to interact with scientists to develop effective assessments of the consequences of climate change for further planning.

This project has focused on assessing the magnitude of climate impacts on terrestrial permafrost. Permafrost covers about 65% of the total area of Russia including several cities and industrial facilities. Warming of the permafrost in this area leads to negative environmental and socio-economic consequences. The high vulnerability of Arctic regions to climate warming is reported in many scientific papers and is a topic of great concern all over the Arctic region, not only in Russia.

The table below provides an overview of the observed impacts of climate change on the permafrost zone in Russia. The project has also assessed the magnitude of projected climate impacts.

Sector	Observed climate impacts	National impact rating	Confidence rating	Data quality rating	Time period	Meta-data *
Coastal systems and low-lying areas	• Intensification of coastal erosion along the Arctic coast	High	Medium	High	1979-2012	1.1
	• Intensification of landslides and thermokarst processes in the permafrost zone	Low	Medium	Medium	1970-2013	1.2
Human settlements, industry, and infrastructure	• Destruction of transport infrastructure in the permafrost zone	High	High	Medium	1970-2010	1.3
	• Destruction of oil and gas pipelines in the permafrost zone	Medium	Medium	--	1990-2010	1.4
	• Destruction of buildings in the permafrost zone	High	Medium	Medium	1970-2000	1.5

* The metadata identifier is used to direct the reader to the information sources used for the assessment. The metadata for this assessment are presented in Appendix 1 of the project report.

State Hydrological Institute (SHI)

It was found that in general the methodology for assessing the magnitude recommended in CLICC suits the Russian data on the permafrost zone, but it should be improved taking into consideration the national features of Russia. More models and projections need to be developed to obtain more robust magnitude assessments for projected climate impacts. An increase in accessibility of data and improvement of data validation is needed.

The UK Assessment of Climate Change Impacts on Flooding

The main source of information used to complete the assessment of the impacts of climate change on flooding in the UK was the 2016 report 'UK Climate Change Risk Assessment Evidence Report.' This evidence report was produced to inform the 2017 UK Climate Change Risk Assessment (CCRA). The Adaptation Sub-Committee (ASC) of the Committee on Climate Change worked with a range of experts to review published data and produce the independent evidence report of the risks and opportunities to the UK from climate change.

The table below provides an overview of the observed impacts of climate change on flooding in the UK. The project also assessed the magnitude of projected impacts of climate change on flooding.

Observed climate impacts of flooding						
Sector	**Observed climate impacts**	**National impact rating**	**Confidence rating**	**Data quality rating**	**Time period**	**Metadata***
Terrestrial and inland water systems	• Observed increase in the frequency and magnitude of flooding • Some evidence suggests that UK extreme weather events (such as flooding) can be attributed to climate change	**High**	**Medium**	**Medium**	**Baseline 1960- 1990 observed until 2014**	**Time period 1.2** **Otherwise: 1.1**

*The metadata identifier is used to direct the reader to the information sources used for the assessment. The metadata for this assessment are presented in Appendix 2 of the project report.

Flood risk is one of the more advanced sectors for climate risk assessments in the UK, with a well-developed, sophisticated modelling base. However, the complexity of assessing current and future flood risk using models comes with its own uncertainties and limitations, including key uncertainties related to modelling flood extent and uncertainty regarding the quantification of the impacts of flooding.

Conclusions

This project has provided an excellent opportunity for researchers in Russia and the UK to compare their respective countries' methodologies for assessing national level climate impacts and discuss the challenges of conducting such assessments. As anticipated, the two issues selected (thawing permafrost in Russia and flooding in the UK) presented very similar challenges for high-level review and synthesis of their impacts across sectors at a national level. The project team has found that the CLICC methodology and template provided a useful and concise format for communicating these assessments in a consistent way to a wide range of audiences, including policy and decision-makers. Although Russia and the UK conducted their assessments in two different ways, completing the template and providing supporting metadata was feasible for both countries.

This project has also highlighted the challenges of bringing together scientists and policy-makers to discuss and understand the impacts of climate change. The project team recognises the importance of communicating climate impacts in such a way that it is accessible and relevant to a variety of audiences, including scientists, businesses, the public, policy-makers, and the international community. The project outputs are designed to provide useful summaries to all of these audiences including technical reports, templates, executive summaries, articles and press releases.

The following conclusions have been highlighted throughout the course of the project:

- The project team recognises the importance of continuing to share experiences and work together to develop consistent and transparent methodologies for assessing and communicating national level climate impacts. This collaboration between British and Russian scientists has provided useful insight to the methodologies used to assess climate impacts in both countries and will provide lessons learned to the ongoing CLICC initiative.
- Further research is needed in both countries to assess the magnitude of climate impacts on additional sectors. The impacts of climate change on the health sector prove to be a challenging topic in both countries where there are still a number of knowledge gaps and uncertainties.
- In Russia, further research is needed to develop climate projections and expand the body of work on understanding future climate impacts. Although progress has been made in recent years on evaluating climate models in permafrost zones, confidence ratings of projected climate impacts in this area remain low due to the need for further modelling work and projections.
- The use of conclusions from assessment reports by policy-makers in Russia remains challenging due to specific technical language of the reports. This project has highlighted the importance of making outputs accessible to policy-makers through the use of simplified policy-relevant formulations and has worked to produce summaries of the project research which are useful to policy-makers.
- This project has begun the process of making information on climate change more accessible to the public in Russia, but there is further work to do. Future projects should build on this and continue to provide clear, robust information which can be communicated to the public in an appealing and engaging way.

Next Steps

The project culminated in a **final project workshop**, which was held on the 1st March at the British Ambassador's Residence in Moscow. This event brought together scientists, policy-makers, and representatives from private sector organisations who are interested in climate impacts on permafrost. Workshop participants highlighted the following recommendations and suggestions for future work on climate impact assessments in Russia:

- Greater focus on social impact assessment which take into account the social vulnerability of the population of Russia to climate change;
- Make an assessment on regional and local scale as well as national scale;
- Take into consideration different scenarios of climate change (including alternative scenarios of cooling);

- Improve the presentation of assessments of climate impacts by considering accessibility, not only for decision-makers but also for the general public and the business community;
- On the basis of the obtained results and future work, develop proposals for the development of new regulations for changing climatic conditions on the territory of Russia;
- Make the project results available to the organisations developing the Russian national adaptation plan;
- Inform the mass-media about the project results and improve the overall cooperation with mass-media in the future work.

Following the completion of this project, the project team also hopes to continue to **develop national level assessments of climate impacts through additional bilateral projects** between the UK and Russia. The project team members have built an excellent working relationship and hope to continue to expand this area of collaboration and research through future projects. In particular, future work could address key gaps in knowledge and assessment systems, such as climate change - human health interactions and presenting information on climate impacts on human health and associated risks in a standardised format. Such work would facilitate engagement between Roshydromet and the agencies responsible for developing adaptation measures and plans in the human health sector in order to more effectively exchange information for better preparedness to cope with the consequences of climate change.

And finally, the project outputs and lessons learned are important to **feed back into the ongoing CLICC initiative** as they will:

- assist the CLICC initiative to regain momentum since the transition from UK Government to UNEP
- feed into the second round of CLICC country pilots that are planned for 2017
- be available to other countries and international bodies via the UNEP CLICC website
- demonstrate that Russia and the UK continue to engage with the CLICC initiative and to play a leading role in developing a standard format for communicating the country level impacts of climate change.