

URGENT ACTION FOR A HEALTHY CLIMATE

Dear COP26 Delegates and Stakeholders,

We are an international coalition of scientists, engineers, physicists, biologists, and public policy experts, combining expertise from the Planetary Restoration Action Group (PRAG) and the Healthy Climate Alliance (HCA).

Our long-term mission is planetary restoration: returning the planet to a safe, sustainable, biodiverse and productive state. The COP26 Parties' current ambition of achieving net zero carbon emissions at some time in the future is totally inadequate to deal with the climate emergency upon us now, let alone to restore the planet to a healthy state. Something drastic has to be done to deal with the current situation in short order.

We are calling for the COP26 Parties to initiate and collaborate in an emergency program to reverse the existing trends towards catastrophic increases in weather extremes, sea level rise and permafrost thaw, any one of which could potentially lead to runaway feedbacks and irreversible climate change. These trends arise from accelerated warming and melting in the Arctic. The Arctic needs to be cooled as a top priority for international climate action. (See diagram and explanation page attached.)

Cooling the Arctic can reduce weather extremes. It is now understood that the unexpected and unprecedented growth in extreme weather, at the heart of the climate emergency, is due to a disruption of jet stream behaviour. The reduced temperature gradient between the Arctic and tropics, created by polar temperature rising three times faster than the global mean, has resulted in a reduction of the energy driving jet stream waves eastward round the planet. This has slowed the movement of weather systems, exacerbating extreme weather events such as deadly floods, droughts and fires in the Northern Hemisphere. (A different form of jet stream disruption is in operation in the Southern Hemisphere.)

We also ask for a parallel program to reverse global warming and reduce concentrations of greenhouse gases (GHGs) sufficient for long-term sustainability: reducing their heating effect and reversing ocean acidification from CO₂ which will help shelled creatures such as corals to recover. This will involve massive drawdown of CO₂ and suppression of emissions of methane and other climate forcing agents. The program should coordinate and supplement existing national and international programs.

All intervention options must be on the table for the emergency program. Techniques must be quickly evaluated for effectiveness, feasibility, equity, safety, timeframe, and the potential for unintended consequences. **An effective plan must be developed on an emergency basis so that implementation can start as soon as possible.**

Having the best possible project management and leadership is critical. Management should quickly produce a critical path analysis to minimise the time for choosing technologies and getting their deployment up to full scale. This would minimise the real risk that the program does too little too late to reverse the accelerating trends in the Arctic. There must be absolute determination to succeed, when so much is at stake. Future generations will not forgive the COP26 Parties if they did not pull out all the stops to try to prevent disastrous climate change and sea level rise.

The emergency program should run in coordination with the parallel program with the goal of restoring the planet to a healthy state for the well-being of all humanity, with measurable short-term, medium-term and long-term targets.

The two programs should together:

1. Protect and regenerate Arctic and Himalayan ice.
2. Slow sea level rise.
3. Prevent runaway feedback loops by lowering temperatures everywhere to safer levels.
4. Reduce emissions of GHGs including methane and other short-lived warming agents.
5. Remove legacy carbon dioxide, methane, and other GHGs from the atmosphere.
6. Improve food productivity while boosting biodiversity.

We propose that there should be a set of targets to be jointly achieved by the two programs:

Arctic and Himalayan targets:

- Halt temperature rise by 2025; return temperature below today's by 2030; refreeze to 1980 levels by 2050.
- Halt the increase in the rate of sea level rise from cryosphere melt by 2025; halt the sea level rise from cryosphere melt by 2030.

Global targets:

- Halt the increase in the rate of mean global surface temperature rise by 2025; halt/peak the temperature rise below 1.5C by 2030; return temperature below today's by 2035; return the mean surface temperature to below the 1980 level by 2050.
- Slow the rise in sea level to below the 1980 rate (~2mm per year) by 2050.
- Halt the increase in the rate of CO₂e rise by 2025; halt/peak the rise below 530 ppm by 2030; return below 1980 level by 2050.
- Halt ocean acidification by 2030; return the pH to above the 1980 level by 2050.
- Halt biodiversity loss by 2030; regenerate soil carbon and ocean biomass to above 20th century levels by 2050.

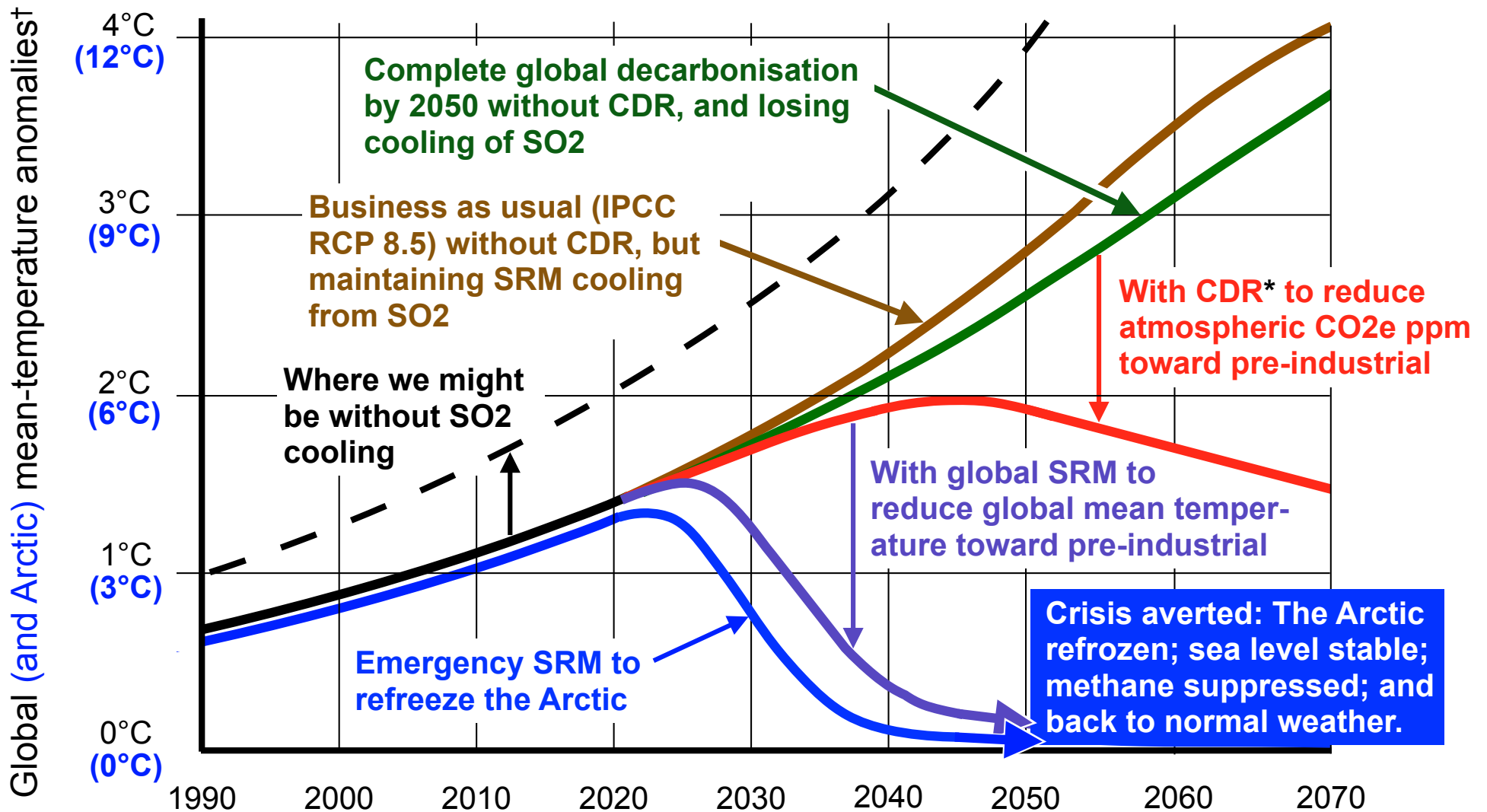
By 2050 the planet should be in a healthier state than it was in 1980. It will be *safer* because dangerous trends will have been reversed, feedback loops (aka tipping points) avoided, storms and other weather extremes reduced, and sea level rise minimised. It will be more *sustainable* because there will be less dependency on fossil fuels, less climate forcing from GHGs and less ocean acidification. It will be more *biodiverse* by restoration of habitats, e.g. in the Arctic. And it will be more *productive* because the regeneration of soil carbon and ocean life will have improved crop and fish production respectively.

This is what we should all want for humanity's future wellbeing: the planet returned to a safe, sustainable, biodiverse and productive state. And we think this is just about possible by 2050, if the world leaders grasp the opportunity and pull out all the stops for activating the two programs we have proposed ASAP. There is no time to lose if 2025 targets are to be met.

We are counting on you. It would be our pleasure to confer with you, your colleagues, and your staff. Do not hesitate to contact **insert your name** at **insert your email address** with any questions, comments, or requests for further information.

Further discussion and references for this letter are available [here](#).

Global-mean and Arctic temperature trajectories for various scenarios, with and without CO2 removal (CDR*) and Solar Radiation Management (SRM)



† Global temperatures (and Arctic temperatures in blue) are relative to pre-industrial norms.

* CO2 removal at x2 current emissions plus suppression of methane and black carbon.

Global-mean and Arctic temperature trajectories for various scenarios, with and without CO2 removal (CDR) and Solar Radiation Management (SRM)

Arctic temperature

The blue line is the trajectory of Arctic temperature, with scale shown in blue on the y-axis. We consider this independently of global temperature, whose scale is shown in black. The blue line is curved downward to show how cooling the Arctic might avoid catastrophes arising from continued warming and melting:

- multi-metre sea level rise from glacier and ice sheet meltwater;
- potentially irreversible loss of sea ice with associated disruption of ocean circulation (the AMOC);
- a multi-gigaton outburst of methane from permafrost potentially boosting global temperature by over 1°C.
- a reducing temperature gradient between Arctic and tropics, accelerated by albedo loss from retreating snow and sea ice, causing increasing disruption to jet stream behaviour (see below).

From 1970 to 2021 the Arctic temperature (shown in blue) has been rising 3 times faster than the global mean (shown in black). This has resulted in an ever decreasing temperature gradient between the Arctic and the tropics. This has disrupted jet stream behaviour causing the increase in extreme weather events which is now considered a climate emergency. If the Arctic temperature rise can be halted and reversed, as shown by the blue line bending downwards, the increase in extreme weather events can be halted and reversed. **This is the emergency Arctic cooling we urge G20 leaders to get done, using the most powerful cooling technology available: SRM at surface, cloud and stratospheric levels.**

Global temperature

The current strategy, espoused by IPCC and most environment activists, is to go for near 100% decarbonisation by 2050. The cooling effect of the SO₂ emitted from coal and oil burning would be lost. The result, without any CDR or SRM intervention, would be the green curve: catastrophic global warming. Even business as usual would be better if it maintained the SO₂ cooling; see brown curve. To avoid dangerous sea level rise from ocean expansion, the global mean temperature needs to be reduced to near the pre-industrial norm within two or three decades, using a combination of CDR and SRM. The diagram shows a lag of 5 years of global cooling behind Arctic cooling; see purple curve. CDR alone would be too slow to reduce the global temperature; see red curve. SRM without CDR would be unsustainable in the longer term; the SRM intervention could be phased out completely as CO_{2e} ppm approaches the pre-industrial 280 ppm.