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Glacier mass change projections and commitments resulting from the Paris Agreement

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At COP21, the UNFCCC agreed to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels". Using an ensemble of global glacier model integrations, we estimate the glacier mass change commitment and its temporal evolution resulting from a hypothesized success of the Paris Agreement.

Our preliminary results indicate that under 1.5°C global mean temperature increase, glaciers will eventually lose mass corresponding to 133 mm SLE (90 % confidence interval: 83 to 154 mm SLE), compared to 164 mm SLE (110 to 184 mm SLE) under 2.0°C warming. In order to stabilize glaciers at their current global mass, a temperature of 0.17°C (-0.13 to 0.43°C) above pre-industrial would be required.

Only a fraction of the long-term mass loss would be realized within the 21st century. Based on scaling existing GCM integrations under the RCP2.6 scenario to 1.5°C global warming, 21st century mass loss of glaciers would correspond to 84 mm SLE (64 to 110 mm SLE). Under the original RCP2.6 scenario, this number climbs to 100 mm SLE (67 to 137 mm SLE).