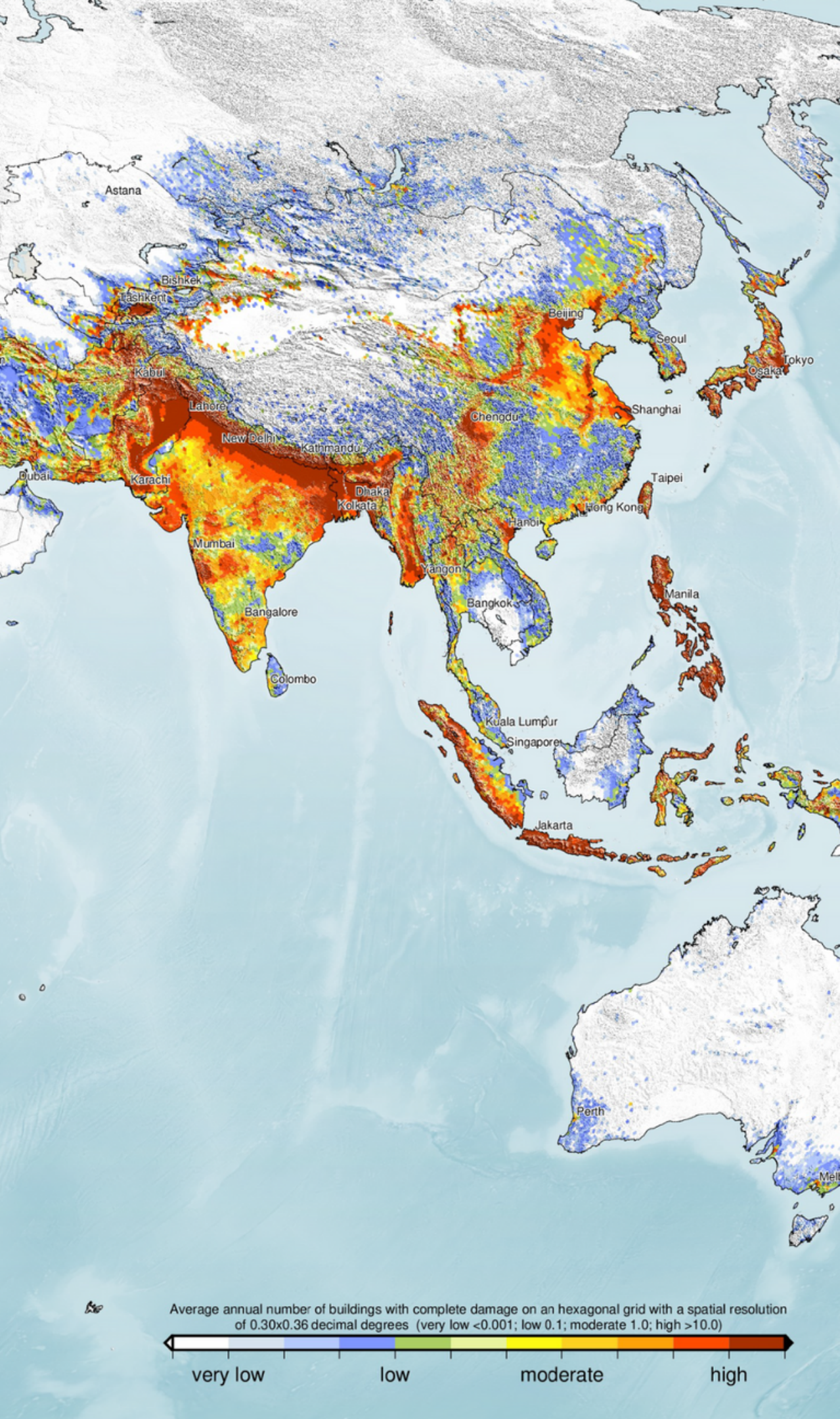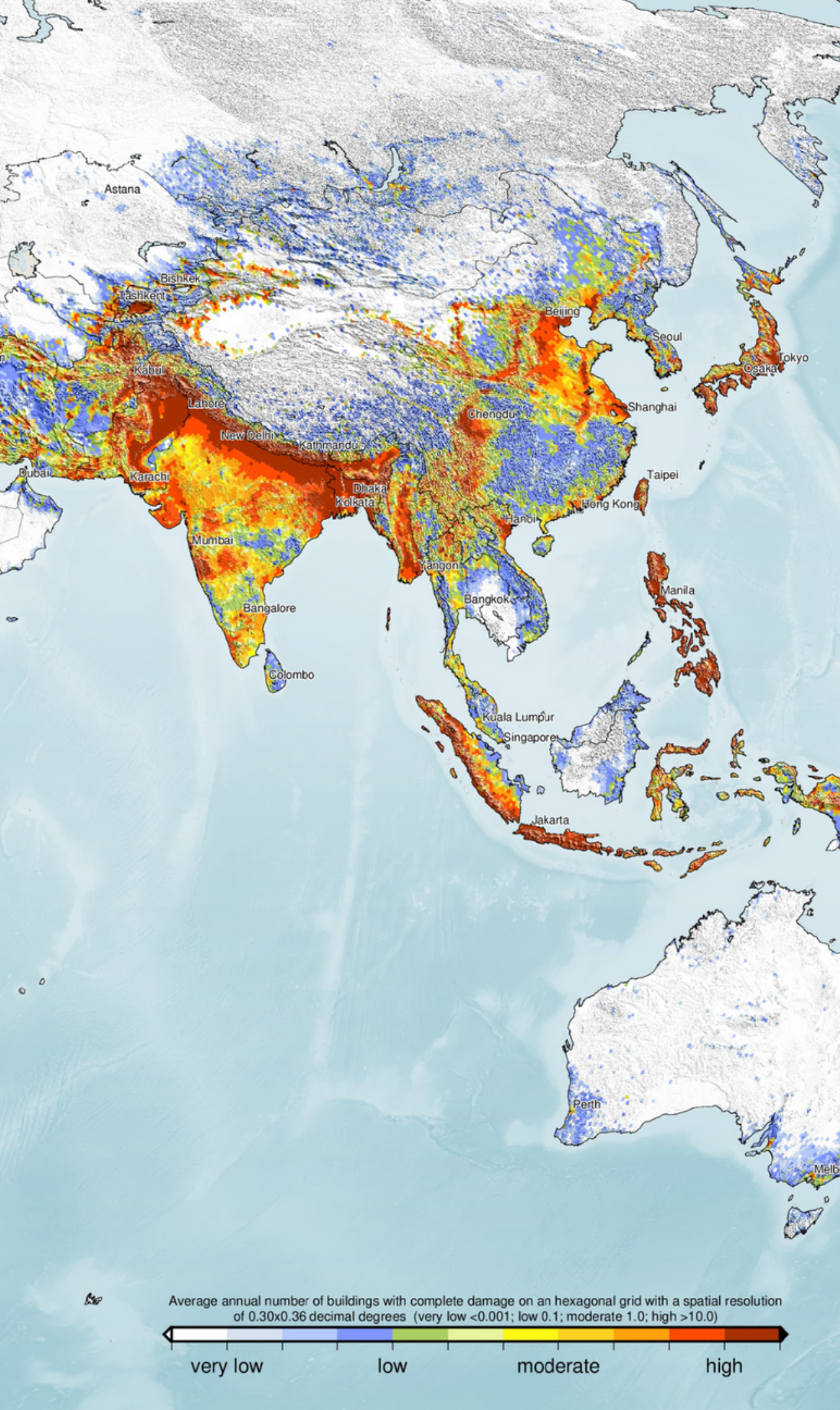# Risk Assessment

The following slides feature questions and answers regarding risk assessment discussed during the launch of GEM's global products, which took place on the International Day for Disaster Risk Reduction in 2023.

Average annual number of buildings with complete damage on an hexagonal grid with a spatial resolution of 0.30x0.36 decimal degrees (very low <0.001; low 0.1; moderate 1.0; high >10.0)

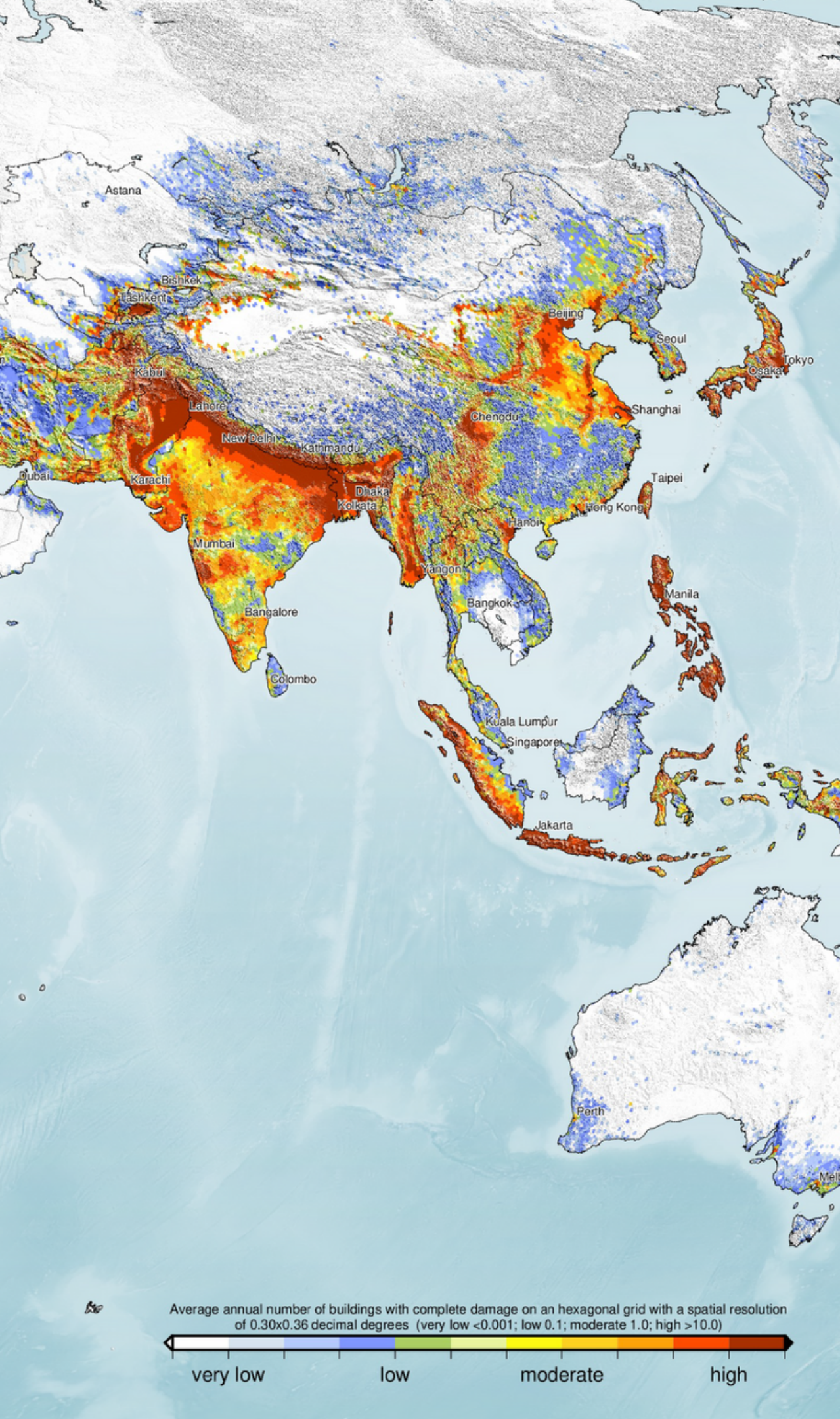very low   low   moderate   high

Also interested to know how location damage distributions are combined between locations to produce an event damage total - the method chosen can make a huge difference in cat model results …

The damage and loss calculations have been obtained using a stochastic event-based approach, as described further in the OpenQuake manual: https://docs.openquake.org/oq-engine-new/master/manual/ We note that the correlation between the ground shaking and loss ratio residuals can be incorporated in the loss assessment calculations.

1

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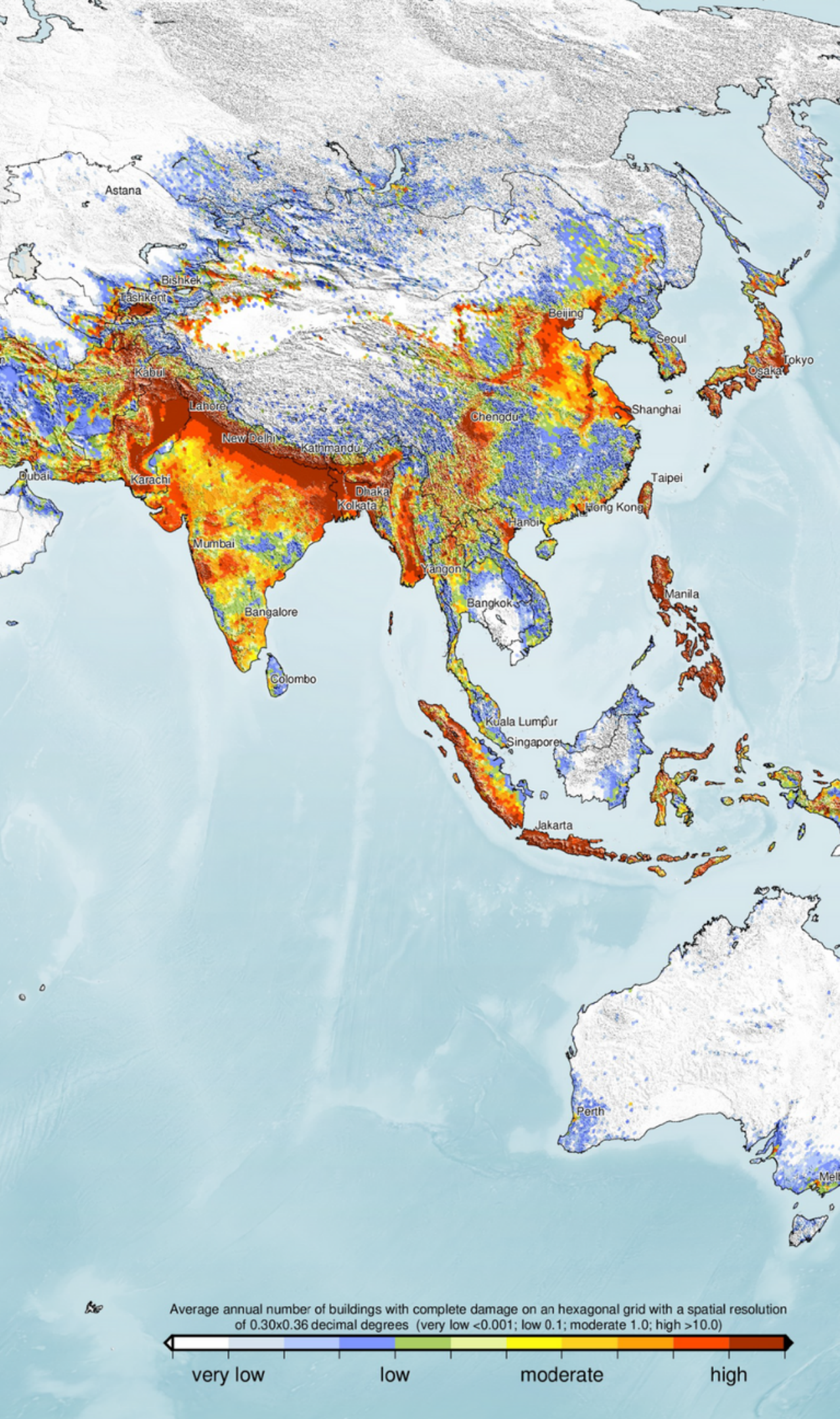
very low · low · moderate · high

Is it possible to include in the analysis the correlation between different hazards? For example fire after earthquake or tsunami after earthquake in coastal areas? Are such after-events included in the loss calculations? Also for the vulnerability functions, how is the business interruption calcualted per site?

In the current set of models and computations, correlations between different hazards have not been included, and the damage and losses are only based on ground-shaking hazard. The OpenQuake engine has algorithms that allow liquefaction and earthquake-triggered landslide hazards to be computed, but we note that the current methodologies to do this are rather uncertain and poorly validated. The openly available vulnerability models do not include business interruption, but we are currently working on expanding the methodology to incorporate this.

2

Average annual number of buildings with complete damage on an hexagonal grid with a spatial resolution of 0.30x0.36 decimal degrees (very low <0.001; low 0.1; moderate 1.0; high >10.0)
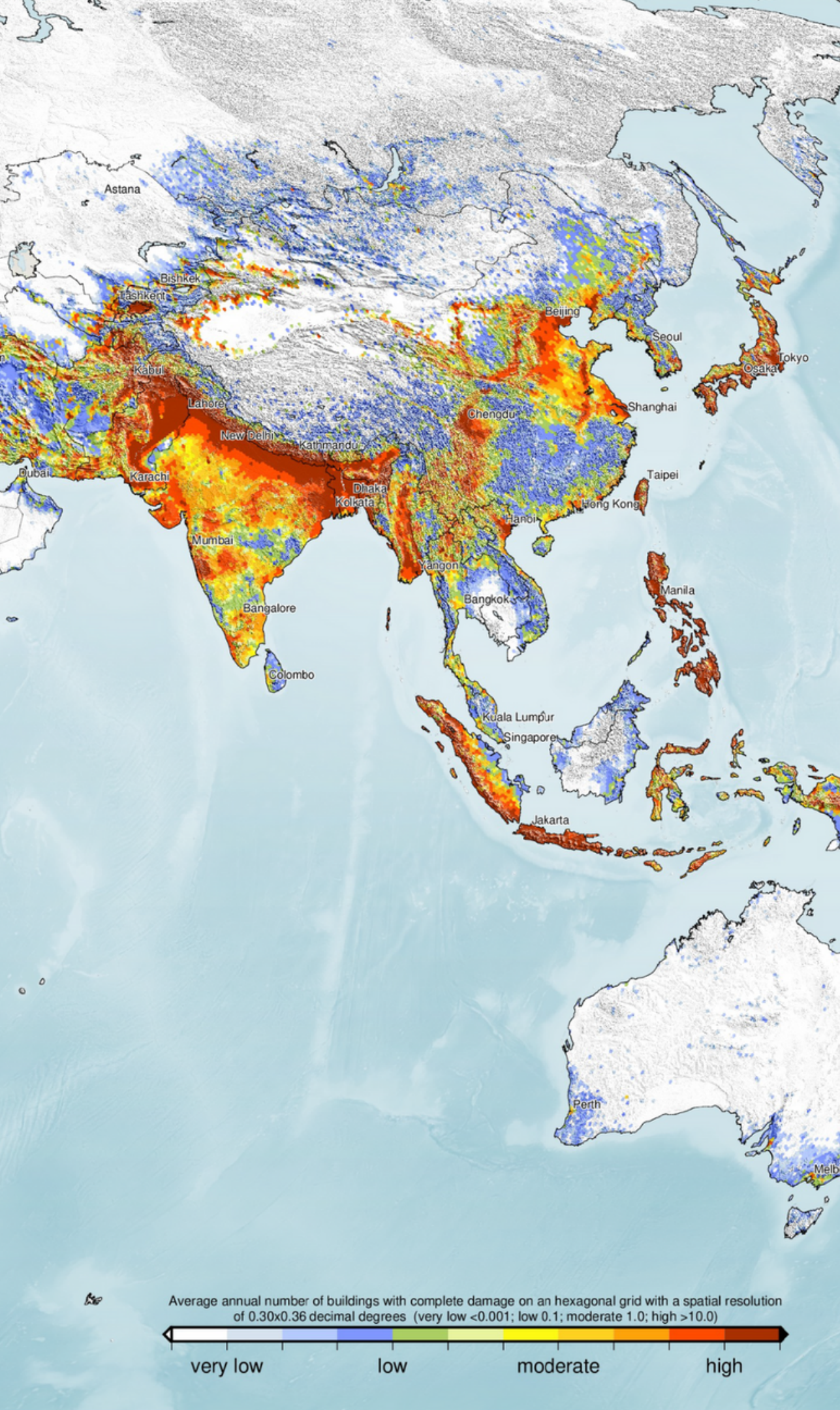
very low   low   moderate   high

Are indirect losses already included into this model, or there is a plan to include it in the future?

The current model does not include indirect losses, it is certainly something we want to incorporate in the future.

3

Average annual number of buildings with complete damage on an hexagonal grid with a spatial resolution of 0.30x0.36 decimal degrees (very low <0.001; low 0.1; moderate 1.0; high >10.0)

very low — low — moderate — high

On the seismic risk side will it be possible to access the simulated worldwide event set that is used in the global quake model?

See video for live answer

4

Average annual number of buildings with complete damage on an hexagonal grid with a spatial resolution of 0.30x0.36 decimal degrees (very low <0.001; low 0.1; moderate 1.0; high >10.0)

very low   low   moderate   high

When an earthquake happens, is it possible to use your product to determine the economic loss with ease? If yes, how does it work?

The models that GEM has released can be used to estimate the economic losses after an earthquake happens, but they are not set up to do so automatically - it requires human intervention and sufficient expertise in scenario loss modelling. In 2024 we plan to work more in this space, providing post-event response to a set of stakeholders.

5

Average annual number of buildings with complete damage on an hexagonal grid with a spatial resolution of 0.30x0.36 decimal degrees (very low <0.001; low 0.1; moderate 1.0; high >10.0)

very low   low   moderate   high

I just want to know how can I assess the residential risk?

You can send us your question through the website and we'll direct it to the risk team

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