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Megathrust large earthquakes: asperities and b-values.

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The largest, megathrust earthquakes can be viewed from different angles, referring to their physics (the slip budget, asperities and plate coupling) or statistics (the Gutenberg-Richter law and its b-value). However, only after joining these apparently different approaches, a coherent picture of the phenomena can be revealed. This work shows that the Gutenberg-Richter law's b-value can be perceived as the link between earthquake physics and statistics. Different b-values can be explained in terms of the slip patterns, or the underlying asperity fault models. As an example, high b-value observed in the case of the largest earthquakes is considered. Finite fault models are available for such earthquakes since 1990s; as representing their rupture histories or slip distributions, they can be used to study earthquake source characteristics and their scaling relations.