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Cirques upon the Kamchatka Peninsula: palaeoglacial and palaeoclimatic inferences

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The morphometry of more than 3,500 cirques upon the Kamchatka Peninsula, Eastern Russia, has been analysed. Volumetric analysis suggests that these cirques have developed rather isometrically—growing equally in all dimensions. The cirques show a very strong N bias in their azimuth, likely resulting from aspect-related variations in insolation. The strength of this N bias is considered to indicate that former glaciation was often 'marginal', and mainly of cirque-type. This assertion is supported by the fact that S and SE-facing cirques are the highest in the dataset, suggesting that glacier-cover was rarely sufficient to allow S and SE-facing glaciers to develop at low altitudes. The strength of these azimuth-related variations in cirque altitude is thought to reflect comparatively cloud-free conditions during former periods of glaciation. These characteristics, of marginal glaciation and comparatively cloud-free conditions, are considered to reflect the region's former aridity, at the global Last Glacial Maximum, and during earlier periods of ice advance. There is published evidence to suggest extensive glaciation of the Kamchatka Peninsula at times during the Late Quaternary, yet the cirque data appears to suggest that such phases were comparatively short-lived, and that smaller cirque-type glaciers were generally more characteristic of the period.