

## Reconstruction of the Thermal Environment Evolution from Subsurface Temperature Distribution in Asian and European Mega cities

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We have been investigating subsurface temperature profiles in several Mega cities for reconstruct the past ground surface temperature (GST), including Tokyo area, Osaka area, Bangkok area, and Berlin area. We examined the shapes of the subsurface temperature profiles and selected ones that are not significantly disturbed by groundwater flow. Reconstruction of GST history for the last several hundred years was made at two sites in the Tokyo area, at six sites in the Osaka area, at six sites in the Bangkok area, and at eight sites in the Berlin area. We used a multi-layer model that allows layers with different thermal properties, determining layer boundaries based on lithology of the formations around the wells. We assumed that temperature variations propagate by only thermal diffusion into the subsurface.

All of the reconstructed GST histories show surface warming in the last century. The GSTs increase ranges from 0.4 to 5.0 K varies by sites. The tendency is that the GSTs increase in the city area are larger than those of rural area. This tendency may reflect difference in the degree of urbanization or human activities.

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