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## The Global Geo Health Data Centre (GGHDC): a web service for human environmental exposures

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## The Global Geo Health Data Centre (GGHDC): a web service for human environmental exposures

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**Abstract:** To study environmental health effects, information is required on human environmental exposures, which encompass a wide range of attributes, for instance air pollution, water quality, or fast food restaurant density. Often it is preferable to assess exposure of each individual in a cohort or population, which requires assessment of exposures for large numbers of people. As direct measurement of personal exposure for entire populations is not feasible, exposure needs to be estimated by mapping environmental attributes, integrating observations and statistical or process-based modelling. This spatially and temporally continuous information is then aggregated over the space-time path of each individual resulting in the exposure of each individual. A key challenge in individual exposure assessment is to overcome the massive data storage and processing required, as spatio-temporal patterns of environmental variables are mapped at a high resolution and coverage. Also, health researchers need to get access to individual exposures. To address these challenges, the GGHDC models and stores petabytes of national and global environmental information at hyper resolution (up to 5 m spatial and 1 h temporal resolution). On top of this archive runs an individual exposure service enabling health researchers to select different spatial and temporal aggregation methods and to upload space-time paths of individuals. These are then enriched by the GGHDC with individual exposures and eventually returned to the user. We illustrate the GGHDC in an example of individual exposures to air pollutants calculated from hyper resolution air pollution data and various approaches to estimate space-time paths of individuals.

**Keywords:** health; individual exposure; air pollution; web service