

## Preface

Time and space i.e. the observed time and location information of the surveyed units or statistical groups comprised thereof are of vital importance for statistical data. Many statisticians at the dawn of the modern statistics directed their interest to the relevant treatment of these factors in survey designing and practices.

In modern census, numerous small areas called “census tracts” were organized to cover exclusively the whole scope of the enumerating area so as to defend from possible oversights and overlaps. Since local authorities are in charge of survey practices, whole area of each municipality was subdivided into a number of census tracts. Thanks to such manner of tract settings, tract-based data could adjust themselves to municipality-based survey results. Traditional census and surveys have disseminated results, in principle, according to the respective hierarchical orders of local authorities. Tables compiled from regional coded individual records usually support regional comparisons. However, local authorities are occasionally reorganized to generate new political and administrative entities. Reorganized bordering of regions has given rise to serious constraints in terms of time series comparisons of regional results. Enormous clerical works were required to obtain comparable data out of regional coded records.

Grid area statistics was then introduced to obtain robust results totally free from reorganization of regional areas. Compiling grid-based area statistics out of tract-based records, however, still requires enormous clerical jobs for reallocation of units. Besides the requirements in the process of data compilation, grid area statistics has rather limited applicability due to the incongruity with administrative units, although the introduction of smaller level grids helps to portray phenomena with higher resolution quality.

Thanks to the removal of selective availability, successful launching of the quasi-zenith satellites and the enormous progress in hybrid positioning technologies, GPS now gives fairly good estimates for location coordinates. The promised precisions which GPS can now enjoy gave rise to a wide scope of new businesses and occasioned innovation to traditional industries.

Statistics is rather one of the latecomers in terms of using location information given by GPS. It is not longer than a decade when some statistical authorities of the world started to turn their attention to the potential usability of GPS coordinates for statistical purposes. Location information given by GPS coordinates is expected not only to cultivate new frontiers of statistical use but also to contribute to improve the surveyed data.

The basic concept which governs this book is derived from an idea that statistics thus far has insufficiently exploited the location information immanent in individual statistical records, although the introduction of questionnaire-based surveys had

paved the road for future cultivation.

Part one will discuss GPS information and exploring new arena of statistical data by loading with GPS coordinates. The second part of this book is assigned to describe varied aspects location information with regard to the micro-based integration of statistical data.

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