DETECTION OF HETEROGENEITY AND ESTIMATION OF POPULATION CHARACTERISTICS FROM THE FIELD SURVEY DATA: 1987/88 JAPANESE FEASIBILITY STUDY OF THE SOUTHERN HEMISPHERE MINKE WHALES

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Abstract. To get reliable information of the age structure of whale population, Japan conducted a feasibility study of scientific research in the Antarctic in 1987/88. Though the sample was not large enough, it was the first data free from the problem of selectivity and whaling ground bias. From the analysis, it was found that the biological characteristics are highly heterogeneous spatially or other ways. Considering this, we recognize that the survey should be designed to collect the sample from the whole research area uniformly to obtain unbiased estimates of population characteristics. However, in an actual biological field survey, it is difficult to keep the sampling fractions precisely the same for each sampling units. Therefore, it is important to detect the heterogeneity in the sample, and poststratify the data corresponding to the heterogeneity. The methodology of the estimation and model evaluation presented here will be useful for the development of biological field survey in general.

Key words and phrases: Line transect, population abundance, heterogeneity of biological parameters, post stratification, bootstrap resampling, model selection, AIC.