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Aria of the Dutch North Sea

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Chapter 3 SOURCE MODELS AND SOUND MAPS

In this chapter, the approaches for sound mapping are explained with the description of source models and the underwater acoustic environment. First, the effect of the sound speed profile on shallow water shipping sound maps is investigated in Section 3.1. The error caused by neglecting the sound speed gradient is calculated for the selected sound speed profiles for the Dutch North Sea. Then, the accuracy of the shipping sound mapping approach is tested by the comparisons between shallow water measurements and sound pressure level calculations which is based on SOPRANO model in Section 3.2. It is shown that the approach used can generate very similar results to the measurements, especially for the low frequencies. This comparison also shows that the neglect of surface scattering can lead errors at high frequencies. In Section 3.3, the airgun array source model which is used for the seismic survey sound maps is decribed. The calculated results are compared with the measurements. Finally, sound maps (averaged over two years) of the Dutch North Sea are introduced in Section 3.4. The annual and weekly energies of shipping, explosion, seismic survey and wind sounds are compared in order to understand which source is making the largest contribution at various time scales.