

DISTRIBUTION OF Na, Mg, Ca, K, Sr AND Li IN SEA WATERS FROM THE BASHI CHANNEL¹

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ABSTRACT

Na, Mg, Ca, K, Sr and Li in sea waters taken at six stations in the Bashi Channel have been analyzed by means of atomic absorption spectrophotometry in order to understand the extent and persistence of the vertical variations. The average concentrations of 118 samples are: Na 10521 mg/l, Mg 1220 mg/l, Ca 400 mg/l, K 388 mg/l, Sr 6.72 mg/l and Li 193 μ g/l. The metal/chlorinity ratios averaged over 118 samples are: Na/Cl 0.5529 $\text{g}^1/\text{g}^0_{00}$, Mg/Cl 0.0640 $\text{g}^1/\text{g}^0_{00}$, Ca/Cl 0.0210 $\text{g}^1/\text{g}^0_{00}$, K/Cl 0.0204 $\text{g}^1/\text{g}^0_{00}$, Sr/Cl 0.353 $\text{mg}^1/\text{g}^0_{00}$ and Li/Cl 10.15 $\mu\text{g}^1/\text{g}^0_{00}$. It is found that Na, Mg and K might vary with depth especially in the eastern Bashi Channel where the main stream of the Kuroshio current passes. These vertical variations are closely related to the water types of the Kuroshio current. The experimental error is generally larger than the standard deviation for Ca, Sr and Li determinations suggesting that these elements might not vary with depth in the Bashi Channel.

INTRODUCTION

Sea water samples taken at six stations in the Bashi Channel were analyzed in order to determine the extent and persistence of vertical variations of Na, Mg, Ca, K, Sr and Li in the Channel. In addition the metal/chlorinity ratios in the samples have been studied.

Culkin and Cox (1966) suggested that the major cation to chlorinity ratios in sea water are generally constant. However Riley and Tongudai (1967) concluded that the average calcium/chlorinity ratio of water samples from depths is generally higher than that of surface samples. Tsunogai *et al.* (1968) suggested that calcium/chlorinity ratio may be used as water-mass tracer. Anderson *et al.* (1970) studied the relationship of the strontium to chlorinity ratio to water masses in the tropical Atlantic Ocean and Caribbean Sea and concluded that the variation of this chemical parameter is consistent with the physical oceanographic description of water flow into the Caribbean Sea.

It should be mentioned that Nagaya *et al.* (1971) suggested that Sr/Cl ratio may not vary with location or depth in the North Pacific and in coastal waters of Japan. However Chen and Jeng (1972a) concluded that the soluble strontium in the South China Sea is not constant and that the Sr/Cl ratio might vary with depth at certain stations in the South China Sea.

Angino and Billings (1966) studied Li contents in sea waters from the northern Atlantic and Gulf of Mexico and reported that Li shows a slow but steady decrease with depth and a weak covariance with salinity. In addition they suggested that there may be real difference in the Li contents of waters from different oceans.

COLLECTION AND ANALYSIS OF SAMPLES

One hundred and eighteen sea water samples were collected with 1.25 liter Nansen bottles aboard R/V Chiu Lien at six stations in the Bashi Channel (Fig. 1). Temperature and salinity

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