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POSSIBLE SOURCES AND ORIGINS OF LEAD IN PRESENT-DAY EAST ANTARCTIC SNOW

ABSTRACT: BARBANTE C., TURETTA C., BELLOMI T., GAMBARO A., PIAZZA R., MORET I. & SCARPONI G., *Possible sources and origins of lead in present-day East Antarctic snow*. (IT ISSN 0391-9838, 1997).

New data obtained in our laboratory on the lead content of Victoria Land Antarctic snow (Hercules Névé) confirm the decreasing trend for the 1980s, as already observed in previous preliminary studies carried out at other sites. Comparison of the lead content trend in the snow of the Atlantic and Pacific sectors of East Antarctica with trends in the consumption of lead in gasoline in the different countries of the Southern Hemisphere show different clear relationships for the two areas. In particular, the location of the two concentration maxima of lead in the snow of the Atlantic and Pacific sectors, makes it possible to distinguish the geographical areas in which aerosols reaching Antarctica originate.

KEY WORDS: Lead, Snow, Victoria Land, Coats Land, Antarctica.

RIASSUNTO: BARBANTE C., TURETTA C., BELLOMI T., GAMBARO A., PIAZZA R., MORET I. & SCARPONI G., *Possibili origini del piombo nella neve recente dell'Antartide orientale*. (IT ISSN 0391-9838, 1997).

I nuovi dati ottenuti nel nostro laboratorio sul piombo contenuto nella neve antartica della Terra Vittoria (Hercules Névé) confermano l'esistenza di un andamento decrescente verificatosi negli anni '80, come era già stato osservato in alcuni studi preliminari condotti in altri siti. Il confronto tra gli andamenti temporali della concentrazione di piombo nella neve dei settori Atlantico e Pacifico dell'Antartide Orientale con quelli del consumo di piombo nella benzina in diversi paesi dell'emisfero sud, mostra differenti relazioni per i due settori, il che consente di discriminare le aree geografiche da cui hanno origine gli aerosol che raggiungono l'Antartide.

TERMINI CHIAVE: Piombo, Neve, Terra Vittoria, Terra di Coats, Antartide.

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INTRODUCTION

Systematic research into Antarctic ice has recently been started to identify both the sources of aerosols reaching Antarctica and their respective geographical origins. The studies have taken into consideration current climatic conditions and those of the last glacial period (approximately the last 100,000 years; De Angelis & *alii*, 1992; Delmas & Petit, 1994; Gaudichet & *alii*, 1992; Grousset & *alii*, 1992; Murozumi & *alii*, 1969; Rosman & *alii*, 1994).

Some studies were based on variations in the isotopic composition of trace elements such as lead (Rosman & *alii*, 1994), or neodymium and strontium (Grousset & *alii*, 1992); others considered the mineralogical nature of the clays present in the dust enclosed within the ice and used global atmosphere circulation models (Gaudichet & *alii*, 1992); and still others exploited the spatial distribution of the concentration of certain major ions in surface snow (De Angelis & *alii*, 1992; Delmas & Petit, 1994).

The consideration of different tracers, however, has led to contrasting hypotheses concerning the geographical provenance of the aerosols reaching Antarctica.

In this paper we discuss the possibility of using measurements of Pb in Antarctic snow, in particular the depth profile for the last 30 years, to obtain information on the geographical origin of this toxic metal found in recent East Antarctic snow.

EXPERIMENTAL

In this study we update and discuss our data set on the Pb concentration trend in shallow snow samples of Victoria Land, adding new data from Hercules Névé (see below) to earlier results obtained on the Mc Carthy Ridge (74° 32' S - 162° 56' E, elevation 700 m, 40 km from the sea, mean snow accumulation rate 27 g cm⁻² y⁻¹ (Piccardi & *alii*,