INTRODUCTION

Based on the provincial mineral potential database, a detailed map of major dunite and serpentinite areas has been compiled. This map is essential for both CO₂ sequestration planning in British Columbia and in exploration for metal, industrial mineral and gemstone deposit types.

CO₂ SEQUESTRATION

In an effort to lower greenhouse gas levels, various geological CO₂ sequestration methods have been proposed worldwide (Nomura and Simandl, in press). Major CO₂ emission sources (> 50kt/yr) for British Columbia have been identified (Nomura and Simandl, 2003). The applicability of these methods is site specific and depends on the tectonic setting and geology in the province of major stationary CO₂ sources. In situ mineral sequestration involves the binding of CO₂ emissions to Mg-silicates, such as olivine and serpentine, to form magnesia and silicate: MgMgO₂ + CO₂ → [MgCO₃] + [MgO]

Mineral carbonation is considered the only method that disposes of CO₂ emissions to a geological, time-scale and end minimum risk of leakage (Ledbetter et al., 1997; OF Cameroon et al., 2004).

Dunite (olivine-rich rocks) and serpentinite zones within ultramafic complexes are considered the most promising sources of two materials for the mineral sequestration process. Tailings derived by past extraction of chrysotile from serpentinites may also provide a source of starting material. Should mineral sequestration of CO₂ emissions become a reality, then these materials will become essential as sources of high magnesia silicates (Nomura and Simandl, in press).

SELECTING RESOURCE BASE FOR CO₂ SEQUESTRATION

1. Suitable targets should be located within the proximity of a major CO₂ point source. 2. Size of resource should be sufficient to sequester 10 to 100 kt of CO₂/day for ~ 10 yrs (on the order of 70-100 Mt of ore).

MINERAL EXPLORATION

British Columbia's ultramafic rocks comprise magnesium silicate forsterite and olivine (Ol), 2.8% chrysotile asbestos (Ch), 1.8% augite (As) and 1.0% quartz (Q). Ultramafic rocks are found in the following areas of British Columbia: the Northern Coastal Belt, the Southern Coastal Belt, the Coastal Mountain Belt, the James Bay Belt, the Skeena Belt, the Coast Belt, the Pemberton Belt, the Southern Interior Belt, the Thompson Belt, the Boundary Belt, the Peace Belt, the Peace River Belt and the Northern Interior Belt. The dunite at Tulameen ranges from fresh olivine in the core of the complex, to highly serpentinized at the outer edges of the body (Findlay, 1963). The dunite at Tulameen contains a large and significant deposit of magnesia silicate (MgCO₃). The dunite at Tulameen is one of the potential by-products of CO₂ sequestration.

REFLECTING ON MINERAL POTENTIAL

ACKNOWLEDGMENTS

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SELECTED REFERENCES

Dana A. Voormeij  and George J. Simandl

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SUMMARY

1. Highlights areas with the potential to contain raw materials for CO₂ mineral sequestration
2. Represents an important mineral resource