

TABLE OF CONTENTS

Chapter 1. Introduction	1
Publications and Abstracts resulting from this Dissertation	3
Publications.....	3
Conference abstracts	3
Publications and Abstracts resulting from side-projects.....	4
Publications.....	4
Conference abstracts	4
Chapter 2: Exploring the structural controls on helium, nitrogen and carbon isotope signatures in hydrothermal fluids along an intra-arc fault system.	6
Abstract	6
Introduction.....	6
Geological and structural setting	9
Sampling and analytical techniques.....	10
Results.....	11
Gas composition.....	14
He, N and C isotope composition	14
Discussion.....	17
Crustal assimilation and contamination.....	18
Mixing with meteoric fluids.....	23
Degassing and calcite precipitation	24
Conceptual model of fluid circulation	26
Concluding remarks	30
Chapter 3. Large-scale structural controls on metal fluxing in active margins: insights from the Liquiñe-Ofqui intra –arc faults systems, SVZ, Chile.	31
Abstract	31
Introduction.....	32
Geological setting	33
Samples and methods.....	36
Results.....	37
Major and trace element composition of geothermal water.....	37
Trace element geochemistry of fumarole condensates	42
Hydrogen and oxygen stable isotope data	43
Discussion.....	47
Structural controls on degassing: acid-sulfate water composition.....	49
Neutral-chlorine waters.....	53
Anomalous PGE concentrations in thermal waters: a pre-enriched basement?	59
Concluding remarks and further implications.....	67
Chapter 4: Cu-As decoupling in an active geothermal system: a link between pyrite and fluid composition.....	69
Abstract	69
Introduction.....	69
Geological background	71
Samples and methods.....	73
Results.....	74
Discussion.....	76

Mineralogical incorporation of metals and metalloids in pyrite from the TGS.....	76
Cu-As decoupling in the TGS: linking pyrite chemistry with paleofluid and borehole fluid composition.....	89
Concluding remarks	92
Chapter 5. Conclusions	94
Bibliography.....	96
Appendix.....	112