Geo Sci 302 Spring 2001

Name _____

Due: **Thursday April 19, 2001**

Igneous Project, Part 3
Research Project: Evolution of the Southern Andes

The **Igneous Project** is comprised of -

- Part 1: Lab#8: Subduction-Related Igneous Activity: Continental Arcs
- Part 2: Hw#8: Evolution of the Southern Andes
- Part 3: Research Project

For Part 3 of the Igneous Project you will be design and implement a group research project. At this point you should have read the article by Singer et al. (1997) and have come up with at least two research ideas that you are interested to pursue for the Igneous Project on the Tatara San Pedro (TSP) volcanic complex, part of the Southern Volcanic Zone (SVZ) in the Chilean Andes. The article by Singer et al. (1997) provides a broad background on the tectonic and petrologic evolution of the Tatara San Pedro volcanic complex during the last 930 k.y. Consider the samples you observed in Lab#8 from Tatara San Pedro and also the new samples from the volcanic complex that have become available (listed on the following pages). The DDM map of the Tatara San Pedro volcanic complex provides field relations and field photographs along with the chemistry, geochronology and paleomagnetics from most of the units. Additional data that is available for the project is listed on the following page and includes data from the recent Tatara Holocene volcanics and regional data from the Andes. During lab time today, you will discuss your ideas together with your group and then brainstorm to decide on the topic you would like to pursue together.

1. At the conclusion of lab **today** (April 9, 2001), your group will turn an outline that includes:
   - A brief description of your research project. What aspect(s) of the TSP do you plan to explore? What is the idea that you plan to test?
   - Plan of action - A brief description of your research plan and who is responsible of which activity.

2. **Progress report** and updated plan of action is due on Monday April 16, 2001. In addition, includes areas where you need clarification or advice. Questions are encouraged.

3. **Poster** report of your group research project, due April 19, 2001

4. **Presentation** of your project on April 19, 2001. Together with your group, you will present a brief 10-15 minute presentation on your research project.

5. You are responsible to understand the other groups' research projects. Your group is expected to ask questions.

The **grading** of the project is comprised

- Part 1: Lab#8: 25%
- Part 2: Hw#8: 15%
- Part 3: Research Project: Group Grade: 30%
  Individual Contribution: 30%

References

Condit, C., 2000, Dynamic digital maps: a Macintosh CD-ROM, Dept. Geosciences contribution No. 72, University of Massachusetts, Amherst, Massachusetts.

Nelson, S., Davidson, J.P., Heizler, M. and Kowallis, B., 1999, Tertiary tectonic history of the southern Andes: The subvolcanic sequence to the Tatara-San Pedro volcanic Complex, lat 36º S, Geological Society of America Bulletin, v. 111, p. 1137-1404.

Singer, B. and others, 1997, Volcanism and erosion during the past 930 k.y. at the Tatara-San Pedro complex, Chilean Andes 36º S, Geological Society of America Bulletin, v. 109, p. 127-142.

Winter, J., 2001, An Introduction to Igneous and Metamorphic Petrology, Prentice Hall, 697 pp.

Additional Data Available:

You can find the data on the desktop "Petrology 302" folders on the 6 good Macs in the Mac lab (LAP 272)

Digital Dynamic Map (DDM) of the Tartara San Pedro Complex

- Condit (2000)

- Geologic map
- Field photographs
- Major, minor and trace elements
- K-Ar and Ar-Ar data for selected samples
- Paleomagnetic data for selected samples

Chemical data for the Holocene lavas from the Tatara-San Pedro complex

- Data from Singer, pers comm.
- File: Holocene.xls

- Major, minor and trace elements
- Sr, Nd and Pb isotopes for selected samples

Chemical data for the subvolcanic rocks of the Tatara-San Pedro region

- Data from Nelson et al., 1999
- Subvolcanic.pdf - PDF file or hardcopy in the Mac lab

- Major, minor and trace elements
- Sr, and Nd isotopes for selected samples

Chemical data for volcanic rocks of the Andes, NVZ, CVZ & SVZ (ca. 500 analyses)

- Data compiled by Winter, 2001
- File: AndesVolc.xls

- Major, minor and trace elements

Chemical data for plutonic rocks of the Andes, mainly Peruvian Andes (ca. 250 analyses)

- Data compiled by Winter, 2001
- File: AndesPlu.xls

- Major, minor and trace elements

Samples (hand specimen and thin section) from the Tatara San Pedro Complex.
(includes new samples)

H-1 (Qlh)
H-7 (Qlh)
H-11 (Qlh)
H-16 (Qlh)
H-20 (Qlh)
H-23 (Qlh)
H-69-311b (pumice sample) (Qlh)
H-72 (Qlh)
H-73 (Qlh)

BP-1 (Qtd)

LV-4 (Qem)
LV-18 (Qem)

QH2-1
QTW 10-3 (Qqt)
QTW 11-3 (Qqt)
QTW 11-4 (Qqt)
QTW 11-12 (Qqt)
QTW 12-1 (Qqt)

Botaugura granite (=Huemel granite, Tgh)

CV Cerro Volcan alkaline volcanics from the AVZ at 46º S - related to subduction of the Chile Rise