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Amphibolite facies ultramafic rocks associated with Mesozoic metamorphites in the Lepontine gneiss complex enclose lenses and boudins of amphibolite, eclogite and calc-silicate (grossularite + diopside + epidote + vesuvianite) rock. Eclogite and calc-silicate rock show gradational bulk-rock chemistry and mineralogy. For example, CaO and Na₂O contents vary continuously from 11.8 to 20.2% and 3.0 to 0.35% the passage from eclogite to calc-silicate rock. At the same time, pyralospite + omphacite + rutile rocks grade through pyralospite + diopside + sphene, into grandite + Al-diopside + sphene + epidote assemblages. In structure, chemistry and mineralogy, the calc-silicate rocks resemble rodingites enclosed in serpentinites in the lower-grade pennine units. Independent, textural evidence for progressive metamorphism of serpentinite into peridotite allow us to infer that the calc-silicate rocks are probably metamorphosed rodingites.

At contacts with peridotitic schists, eclogites and metarodingites have been metasomatically converted to amphibolite and hornblende-schist rock respectively. The final passage into ultramafic rock is made first through thin actinolite-rich and then chlorite-rich layers.

With the assumption that there is an exclusive relationship between rodingitization and serpentinization, the recognition of metarodingites within medium and high-grade metamorphic ultramafic rocks provides available information on geological history. An association of metarodingites with fresh garnet-peridotite at one locality near Cima di Gagnone, Val Zasca, suggests that there may be garnet-peridotites in alpine peridotite associations that are not derived directly from upper mantle sources.

LOW TEMPERATURE RHYOLITES FROM THE ROOSEVELT GEOTHERMAL AREA, UTAH.

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A suite of Quaternary silicic volcanic rocks is associated with the Roosevelt Hot Springs geothermal area in southwestern Utah. The volcanic sequence, erupted through a large granite body, consists of interlayered obsidian, perlite and ash. The obsidians are remarkably similar in composition, silica rich, and low in water content. An average of six obsidian analyses yields SiO₂, 76.48; TiO₂, 0.06; Al₂O₃, 12.39; Fe₂O₃, 0.34; FeO, 0.40; MnO, 0.05; MgO, 0.13; CaO, 0.60; Na₂O, 3.91; K₂O, 5.10; P₂O₅, 0.01; H₂O⁺, 0.12; H₂O⁻, 0.06; total, 99.65%. The volcanic ashes contain up to several percent H₂O. The mineralogy consists of alkali feldspar, plagioclase (An₂₀), and small amounts of Ti oxides, biotite, hornblende, augite and rare olivine.

Quench temperatures obtained from coexisting Fe-Ti oxides range from 650 to 710°C at oxygen fugacities of about 10⁻¹⁷ bar. The Kudo-Mei plagioclase thermometer yields similar temperatures near 700°C. Calculated water fugacities, for these temperatures, range from 400 to 600 bar. From estimates for densities of liquids of the composition of the obsidians the source region to the magmas has been calculated, assuming that conditions approaching hydrostatic equilibrium existed; calculated depths range from 13 to 16 km below sea level. We suggest that the lavas originated by partial fusion within the crust, and that a regional paleogeothermal gradient of about 50°C/km is indicated.

SYNOPSIS OF RECENT BURROWING INSECTS AS ANALOGUES OF NON-MARINE TRACER FOSSILS

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Lincoln, Nebraska, 68508; Ratcliffe, Nebraska State Museum, Lincoln, Nebraska. The rare occurrence of trace fossil-produced burrows may have considerable members of about 19 families distributed in the substrate during at least part of a discreet shaft (vertical or inclined) of fossilization. Preliminary inventory of lebensspuren indicates considerable probability of taxonomically dissimilar insect body taxa that produced them. Nonetheless, the density of Recent insects to be considerably higher in moist uplands. Furthermore, the probability of all types in areas of deposition is greater than in areas of erosion (uplands).

ASSESSING THE EFFECT OF FUTURE LAND USE

WESS, Robert H., Geological Survey

Abundancy, Robert H., Geological Survey

Science Service, Albany, New York 1

Land-use planners and construction eng

consequences of regionally extensive

ways or new suburbs, upon the availab

develop schedules that are most con

and gravel reserves. Study of the c

the Rochester, New York region suggest

future market conditions resulting f

the technique are similar to the analy

central-place market theory. Mapping pas

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boundary changes through time. Th

characteristics used for predict

by introducing perturbations, such

or new zoning regulations, to the c

Changes in both transportation

can be anticipated by applying the

times in the region. These changes

the original plan will occur. Once re

demands are catalogued, it becomes

construct scenarios for any set of planne

Rochester area illustrates how a plan

force local sand and gravel operator

built, the highway will isolate many

their planned markets and thus restri

effective for residential use by this ne

CHARACTERISTICS OF THE ALKALI SITE IN K-NA FE

Penon, Philip M. and Gordon E. Brown,

University, Stanford, California 94

despite of the significant covalent con

as a simple electrostatic bonding mod

insights regarding stability relati

onomi et al., 1972) and the energeti

distributions in silicates (Whittaker, 1

have utilized such a model based on B