

ting and associated volcanism is
y a major transform fault system.
of northern California, andesitic
om actively spreading oceanic ridge
nd tectonism coincided with changes
corded in magnetic-anomaly patterns
reflecting intersection of North
, mutual annihilation of sectors of
ench, and initiation of a transform

RECENTLY ACTIVE TRACES OF THE GARLOCK al Survey, Menlo Park, California

Garlock fault reveals significant
ence of recent movement. At its we
tinctly older than the intersected
n general, scarps, ridges, valleys
ssively better preserved and hence
though decreasing rainfall eastward
ion.

n area west of Pilot Knob Valley
low scarps traverse nearly all
stream channels; many small offset
obes imply a recent event that
ment. Furthermore, a 2-km length
may be active, because fresh en
left-lateral displacement crossed
ms.

the Garlock fault is in alluvium
same line or narrow zone. However
zones tens to hundreds of meters
rock. Parts of the fault along
of Mojave indicate a history of
trace away from the upthrown block
distributed across much of the
t 33-km long that occupies the

CENTRAL CALIFORNIA CRETACEOUS BASIN

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nd isopach data have been used
a half of California. 2) an area
nd 3) the Santa Lucia Range area
and that there were two linear
en echelon; one in Central California
la.
ous beds of the Santa Lucia Range
from the granitic basement of S

Geol. Soc. of Am., Abstracts

MEETING IN HAYWARD, CALIFORNIA

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Unslipping the San Andreas fault 350 miles places the en echelon prisms
of Cretaceous deposits in alignment and parallel to the ancient shore-
line of the eastern source terrane; it moves the Santa Lucia Range
portion of the Salinia block out of the Central California terrane.

Paleocurrent and paleoslope data obtained in the Mohavia block re-
flect trough-like topographic control on the accumulation of these
beds. Sediment dispersal directions were primarily to the southeast and
secondarily to the northwest and west. No west to east direction of
sediment transport has been detected. The great thickness of these
beds; the locus of their maximum thickness; and their narrow linear
distribution in the N-S direction suggest that these beds were entrapped
in a trough-like furrow.

Two modern analogs are considered as models. One is an ocean floor
trench like the Peru-Chile Trench & the other is the submarine continen-
tal slope off central California where sediment-transporting bottom
currents flow directly to the west from an eastern source terrane. The
first model best fits the data.

SEASONAL VARIATIONS IN HYDROGRAPHIC PROPERTIES OF THE OCEAN ADJACENT TO SAN FRANCISCO, CALIFORNIA

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94025, William W. Broenkow, Moss Landing Marine Laboratory, Moss
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The hydrographic and chemical properties in the coastal ocean
adjacent to the Golden Gate are important when considering the mixing
of these waters with fresh water discharged into San Francisco Bay.
The seasonal distributions of properties offshore are largely dependent
upon the seasonal nearshore wind field and geostrophic circulation, and
upon the river discharge.

The northerly winds during late spring and early summer induce
shallow coastal upwelling, bringing cool (10-11° C), phosphate-rich
(1.2-1.4 µg-at/l) water to the 20 to 30 meters-thick wind-mixed layer.
During late summer and early fall the winds shift and weaken, resulting
in diminished upwelling, warmer surface waters (13-14° C), and lower
phosphate concentrations (0.8 µg-at/l). In the oceanic winter (December
to March) the wind-mixed layer deepens to 50 meters; the surface
temperature decreases to 11-12° C and the phosphate concentration
increases to 1.0-1.2 µg-at/l.

Minimum salinities (33.0-33.2 o/oo) are found during highest local
precipitation and fresh water discharge into San Francisco Bay
(February to April). Maximum salinities offshore (33.4-33.6 o/oo)
are found during the dry season (July to September).

LATE GLACIAL AND POSTGLACIAL DACITIC VOLCANISM NEAR LASSEN PEAK, CALIFORNIA

Crandell, Dwight R., Donal R. Mullineaux, and Gordon D. Bath, U.S.
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Formation of Lassen Peak dome, and similar domes nearby, followed
pyroclastic eruptions and pumice flows. Although Lassen is in a re-
gion of predominantly andesitic and basaltic rocks, late glacial and
postglacial eruptions within a narrow north-trending zone about 5 miles

LASSEN VOLCANIC NATIONAL PARK
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Crandell (late)

long including Lassen Peak have been of dacitic rocks. Consistent orientation of north-seeking poles in pumice fragments indicates that the pumice flows were hot when they came to rest.

Lassen Peak dome rose at the south end of the zone during late-glacial time, perhaps 11,000-12,000 years ago. A pumice flow interbedded with late-glacial sediments southeast of Lassen may have been erupted from a vent later covered by the dome. Pumice fragments in this flow, as well as the dome rocks, have normal polarity.

Several other domes occupy the north end of the zone; although some predate the last glaciation, others may be of late-glacial or post-glacial age. The domes have normal polarity, but fragments in a late-glacial pumice flow from the area of the domes have north-seeking poles that point southward and are nearly horizontal. After a-c demagnetization the direction of these north-seeking poles changed to northeast and became about 60 degrees above horizontal. This anomalous polarity may be related to the Laschamp reverse polarity event.

Younger pumice flows between Lassen Peak and the northern domes were erupted at vents that later were intruded by the Chaos Crags domes. Radiocarbon ages of charcoal from 5 different flows are 1,000-1,200 years; pumice fragments in the flows have normal polarity.

A METHOD FOR DETERMINING REFRACTIVE INDICES OF MICROSIZE PARTICLES

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A simple method for measuring refractive indices of microsize particles has been developed during attempts to identify specimens from the Luster micrometeoroid collecting experiment. Since orientation of microsize particles (< 100 microns) is extremely difficult and requires excessive time and great care to prevent losses, a simplified technique was developed which allows rapid determinations without knowing particle orientation. For isotropic materials the value obtained is the correct refractive index to within $\pm .001$. For materials which are uniaxial or biaxial, the value obtained is usually intermediate between the upper and lower limit. This information is then combined with x-ray diffraction and/or emission data to provide a positive mineralogical identification for the microsize particle.

Successful particle recovery has been considered a primary objective during all phases of these studies in order to retain specimens for further analyses. The purpose of this paper is to delineate procedures which have been used and the reproducibility obtained when performing routine refractive index measurements on single particles 10-100 microns in size.

PALEONTOLOGIC AND STRATIGRAPHIC EVIDENCE FOR AND AGAINST SEA FLOOR SPREADING AND OPENING AND CLOSING OCEANS IN THE PACIFIC NORTHWEST

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In the Pacific Northwest (Oregon, Washington and southern British Columbia) the paleontologic and stratigraphic record shows features that could be used to suggest a closing and opening of the Pacific Ocean and the leaving behind of a part of the Asian landmass attached to North America.

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In Middle Devonian time the part of the shoreline and shelf of Devonian reefs and organic carbonate formed on this shelf. By late Devonian Asia collided gently with western North America but they closed again by the Permian and Early Permian an episode took place during the Late Triassic period. The later orogenic history interpreted on the basis of shifting tectonics.

Tethyan and "American" faunas spanning and closing oceans but might environmental differences. The new evidence provide an additional complication in history. They may give us the considerably greater amount of paleontological field work (a lost art to some geologists).

SEISMIC RESPONSE IN LAS VEGAS, NEVADA TEST SITE

Davis, L. L., and R. D. Lynch, 813 North Royal Street, Alexandria, Louisiana. Because of its size and proximity to the Las Vegas area is of considerable importance in program, particularly with respect to this paper is to describe the seismic response of the level of motion as determined from ground motions and the frequency content of the Pseudo-Relative Velocity Response. For specific stations, the variation in response and the overall response in the city.

Two approaches were used to estimate seismicity. First, a standard station data other stations to SE-6, were independent of source parameters and minor transmission path differences characteristics relative to SE-6. Ratios of amplitudes and for the PSRV amplitudes and 2.469 seconds. The geometric systematic differences at some stations the statistical technique of covariance station data are pooled to determine the total sample. The analysis provides factors from which relative amplitudes are determined.

SURFACE WAVE SPECTRA FOR EARTHQUAKE TILTMETER

Derr, John S., Department of Earth Sciences, Massachusetts Institute of Technology, Cambridge, Massachusetts. Earthquakes and explosions recorded