

west to east and not the actual
the relatively high Al_2O_3 content,
the tendencies are consistent with
in of calc-alkaline rocks through
models are (1) partial melting of
partial melting or fractional
olite between 15 and 80 kms. Be-
d in high grade, gneiss complexes,
occurred relatively shallow depths
required to reconcile the field
sequently the second model is

CHARACTERISTICS

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gram developed for calculating
ion is given. The equations
ly linearized and written in a
merical model is applied to
he Rat Islands tsunami and the
tion were compared with field
(gage records) and those
developed previously. Finally,
propagation in the Rat Island
ussions of directionality of
ction of the Bering Sea and the

K AND PHYSICAL PARAMETERS OF

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mined, based on the propagation
fect of physical parameters on

It is shown on the basis of the
ocation function has quite diff-
c and subsonic propagations of
gation, the growth of rupture is
the head of crack, and the fin-
ocess. The process of the rup-
a cohesive force working across
k edge. This consideration of
ffith's energetic criterion. It
welded by friction after some
time function is proposed based
es the physical parameters, such
rupture velocity and the size of

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fault plane, which are intercorrelated with one another by the relation-
ships derived from the stress boundary condition and the consideration
of rupture growth.

A TECHNIQUE FOR DETERMINING THE PROPERTIES OF SEISMIC NOISE IN GEOTHERMAL AREAS

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Two experiments were conducted at the Geysers geothermal area (80
miles north of San Francisco) in California to study the nature of
seismic noise. In the first experiment, during April 1971, a small
L-shaped array of five seismometers spaced 0.5 km apart was operated
in one place for three nights. In the second experiment, during
September 1971, a triangular array with 1 km seismometer spacing was
operated for about a week in one location while another array was
operated in four different locations. An evaluation of the data shows
the following: (1) The level and shape of the seismic noise spectrum
varies by an order of magnitude within an area of 6 km square covered
by the experiment. (2) The predominant energy is in the frequency
band of 3-6 Hz. The average signal velocity amplitude is of the order
of 30 millimicron/sec. (3) The activities associated with the
electric power generation from steam contributes to the level and
complexity of noise. (4) Use of arrays enables determination of
velocity and direction of travel of the seismic noise. Preliminary
indications are that noise velocities higher than those associated
with surface waves are observed at the Geysers. Coherence between
wave trains is hard to observe at stations more than 1 km apart.
Use of arrays seems to be a promising approach to decipher the
complexity of seismic noise in geothermal areas.

THE HAWAIIAN-EMPEROR CHAIN AND ITS RELATION TO CENOZOIC CIRCUMPACIFIC TECTONICS

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The Hawaiian Ridge and Emperor Seamounts appear to form a single chain
of tholeiitic shield volcanoes that erupted sequentially from NW to SE
on the sea floor of the central Pacific Ocean during Tertiary and Qua-
ternary time. The chain cuts obliquely across the older structural
patterns of that sea floor. While the pattern of the chain as a whole
is linear, the individual volcanoes lie on short, sigmoidal, en echelon
loci that are subparallel with respect to each other and that may
represent extensional features in the crust and upper mantle. The rate
of progression of volcanism along individual loci is nonlinear where
best studied in the southeastern part of the chain, and simultaneous
eruptions appear to have occurred within a distance along the chain of
about 200 to 400 km. The available data are consistent with a genesis
related to the motion of the Pacific crust over a melting spot in the
mantle. This melting spot, which may be due to either excess heat or
pressure release, appears to have a diameter of about 300 km and is
presently centered slightly north of the island of Hawaii. Our best
estimate of the age of the Hawaiian-Emperor bend, based on the existing
radiometric data, is 24.6 ± 2.5 m.y., which correlates with a time of
increased tectonic activity in the western Pacific island arcs and with
changes in the nature of the plate boundaries in the northern and east-
ern Pacific. The vector change in the motion of the Pacific plate with

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