

ate from calcium carbonate-
Pacific, Indian and Atlantic
technique. Sediments from
on orders and rate constants.
a simple manner as a function
diment size fractions have
surface area at equivalent
d between dissolution rates
ific Ocean water column when
used. Dissolution rates in
those found in deep seawater
ration.

tion between the two is discontinuous and results largely from the
critical role of seawater Mg in generating and maintaining acidity.
For the end-member case of seawater heated alone, H⁺ is generated by
precipitation of a Mg-hydroxysulfate at 300°C and above. When basalt
is present it contributes silica, and acid conditions result from the
formation of smectite and mixed-layer clay. In the presence of excess
Mg²⁺ this acidity is maintained, and smectite and anhydrite are the
only minerals which form. Under these seawater-dominated conditions,
concentrations of Fe, Mn, and Zn are high and easily exceed the minimum
necessary to account for the rate of metal accumulation on the East
Pacific Rise. In a rock-dominated system, by contrast, acidity
generated by Mg-silicate precipitation is "titrated" by silicate
hydrolysis reactions, resulting in a near-neutral to slightly alkaline
solution with metal concentrations 10-40 times lower. Under these con-
ditions in nature the typical greenschist assemblage of Chl-Ab-Ep-Act
can form. The transition from rock-dominated to seawater-dominated
conditions occurs at a water/rock mass ratio of about 50 at 300°C.

ATHABASCA REGION,

University of
Saskatchewan

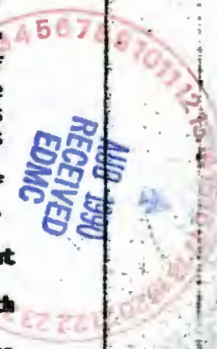
tion are reviewed. Multiple
Bi, Cu, Mo, V, As, Se and
or in early Aphebian supra-
seminated deposits. Mobil-
by hydrothermal pulses
genies (~1750 and ~1000 m.y.
ts are analogous to others
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genetic facies may have
es, arkosic arenites and
e may have been either sites
or might have acted as
thermal activity. In the
temperatures of 80° to 440°C
5°C for the Rabbit Lake
(showing the Athabasca Fm.
the thesis that the U
ty during Helikian times is
zable are probably of
unconformity type" deposits
ized U deposition at or
was caused by the emergence
asting physico-chemical
y.

AGE OF THE LAST MAJOR SCABLAND FLOOD OF EASTERN WASHINGTON, AS
INFERRED FROM ASSOCIATED ASH BEDS OF MOUNT ST. HELENS SET S 16-2

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Four groups of upper Pleistocene pumice layers from Mount St. Helens,
called sets C (oldest), M, K, and S (youngest), are mineralogically
similar to certain cummingtonite-bearing ash beds of the channeled
scabland. The scabland ash beds occur as closely spaced "couplets"
and "triplets" in fine-grained sediments associated with gravels of
the last major scabland flood. Fe-Mg mineral suites and refractive
indices and chemical compositions indicate that set S pumice layers
are the near-source equivalents of "couplet" and "triplet" ash beds
exposed near Vantage and Wanapum Dam along the western margin of
the scabland. These data confirm earlier tentative correlations of
set S with scabland ash beds by us and several other investigators.

Near Mount St. Helens, set S is dated by radiocarbon as about
13,000 years old. Thus, the last major scabland flood is also about
13,000 years old, in contrast to most previous estimates of about
20,000 years or older. The younger age, however, is consistent with
an age estimate of possibly 14,000 years for a scabland flood by
H. H. Hammatt, L. L. Foley, and F. C. Leonhardy in 1976. It is also
consistent with an age of less than 13,500(?) years estimated for the
last flood by R. B. Waitt, Jr., in 1977 from relations of flood and
glacial deposits marginal to the scabland. In addition, an age of
about 13,000 years for the last major scabland flood is supported by
a radiocarbon date of 13,080±350 years (W-3404) we obtained for peat
that directly overlies the Portland delta of J. H. Bretz, which is a
downvalley deposit of that flood.



OCK- VS. SEAWATER-DOMINATED
ERMAL DEPOSITS

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nia 94305

performed reacting seawater
a range of conditions: 25-
ios from 1 to 125. Much of
hydrothermal apparatus, which
ion through time. These
ratio effective during
on both the chemistry of
s produced. Two types of
ter-dominated. The transi-

DEEP CARBONATE BANK MARGIN TYPES IN THE NORTHERN BAHAMAS

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Deep (>100m) carbonate bank margins surrounding Little Bahama Bank
(LBB) and northern Great Bahama Bank (GBB) exhibit diverse structures
and sedimentary facies that are controlled by a complex interplay of
tectonics, off-bank sediment transport, gravity and pelagic sedimenta-