the recurrent microearthquake activity in the region, and the simil-
ity in strike (north-northeast) of the dome axis, the major fault-
lineament set, and the inferred mantle ridge of Simmons (1964).

CLAY MINERALOGY OF SOME ARCTIC SOILS ON THE NORTHERN CUMBERLAND PENINSULA, N.W.T., CANADA

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The types and abundances of clay minerals in fifteen Arctic Brown and Polar Desert soil profiles formed from Neoglacial and Wisconsin glacial deposits were studied in relation to age, lithology of soil parent material and to variations in vegetation and topographic position. Qualitative and semi-quantitative x-ray analyses of the clay-sized fraction show that illite (partially degraded biotite) and vermiculite are the dominant clay minerals in soils derived from granitic gneisses. Minor amounts of chlorite, halloysite and/or kaolinite also occur. Illite is more abundant than vermiculite and in most profiles, was identified along with chlorite in the unaltered parent material. In contrast, randomly oriented mixed-layer illite-montmorillonite is found only in soils formed from deposits of basaltic origin. Soil clay-mineral assemblages appear to vary with age. In general, there is an increase in the amount of vermiculite in the A horizons of the progressively older granitic soils. Within the entire soil profile, the relative percentage of illite decreases towards the surface. This loss of illite is accompanied by an increase in the amount of vermiculite, thus suggesting that the dominant process of pedogenic clay development is the hydration of mica together with ionic substitution resulting in an illite to vermiculite transformation in the upper horizons.

PRECISION GRAVIMETRY AT THE GEYSERS, CALIFORNIA

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A typical geothermal well at The Geysers removes about 68,000 kg of fluid per hour from the subsurface. A net mass loss of this amount will produce a change in gravity which should be detectable in a ye time, provided the loss comes from a reservoir beneath the observing station and from within several kilometres of the surface. For example, if extracted mass were being lost from the 1 to 2-km depth of well completion in the older part of the field, there would be m than 0.1 mgal change per year--more than twice the amount distinguish able by precision repeat gravity. Preliminary measurements at The Geysers geothermal field suggest that: (1) fluid depletion is occurring at a true reservoir depth greater than 4 km; or (2) altho there is recharge immediately beneath the gravity net, an adjacent part of the reservoir is being depleted; or (3) the recharge or elevation change in the region is greater than anticipated from present models of vapor-dominated geothermal systems.

DIRECT CRYSTALLIZATION OF SMECTITE CLAY (NONTRONITE) IN PRECAMBRIAN HYDROTHERMAL VEINS, SOUTHERN VENEZUELA

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The presence of clay minerals as constituents of hydrothe mal veins has long been attributed to either deuteric or hydrothermal alteration of primary vein minerals or their subsequent alteration by meteoric waters, following expos Though various clay minerals have been synthesized direct

high temperature solutions, litt
anted to indicate that this has t
ems. Recently discovered veins of
the Guayanan Shield of Venezuela p
ngly suggest an origin by direct
Chemical analyses of the mineral
d less than 0.3 percent alumina.
oaches the composition of the pre
member of the Beidellite-Nontroni
of the sample, and its overall ch
rigin by alteration of any concei
e igneous rock. Further, detailed
s indicated that nontronite was e
ral present. Though some specular
samples contained no remnant prim
y minerals. Both would be expecte
by either hydrothermal alteration
An origin is therefore postulate
ers acted to dissolve and mobilize
by iron formations. Subsequent in
se solutions formed the nontronite

MICITY AND GLACIAL REBOUND IN THE CENTRA
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ismotectonic model for the Central Stabl
affect of glacial rebound as well as oth
ra-plate movements, mantle plumes, and r
gative relationship between seismicity
ied by the coincidence of the glacial ma
hquake epicenters. We propose that this
stress release at the glacial margins d
erence between areas still loaded by dri
within the glacial forebulge, and the u
ern results in relatively earthquake-fre
t, a ring of epicenters at the glacial t
within the forebulge, and another epice
of the glacial forebulge. The concentr
printed by tectonic effects in areas of
ting such as New Madrid and the St. Lawr
ment.

The figure below shows the distribution o
enters in the glaciated region of the ce
ed States intended to support our conclu
Mississippi Embayment and the Appalachia
erous small clusters of epicenters that h
resting characteristics:

1. Many of the epicenters are situated a
ins. This is true for those at Manhatta
hwestern Indiana, Louisville, Kentucky,
. Furthermore, the Appalachian trend al
ial limit (in southeastern Pennsylvania)
glacial limit along the northeastern U.
2. There is a noticeable absence of seis
ial limit in a 200-mile wide marginal zo
ion of the Mississippi Embayment) corres
"glacial forebulge." Beyond this 200-mi
occurrence of seismicity, as in western