

DREW, STEPHEN R., Industrial Processing Div., DSIR, Wellington, New Zealand

#### Industrial Use of Geothermal Energy in New Zealand

The industrial use of geothermal energy for process heating in New Zealand is anticipated to double, and possibly treble, over the next 15 years. The forest processing industries are likely to remain the largest users, as maturing exotic forests exist close to the known geothermal fields.

DSIR engineers have recognized the need to improve the technology used in these geothermal energy supply plants. Development projects are aimed at raising the thermal efficiency and reducing the environmental impact of the existing single-flash recovery system. Projects implemented include performance monitoring of production geothermal heat exchangers, field testing of an experimental heat exchanger, and demonstration of silica and arsenic removal processes to treat geothermal water.

Future advances are illustrated by a simple model for a process steam generation plant which would be a common operation for any industrial user. Flow sheets are presented to compare the merits of multistage, total flow, and cascade heat exchanger systems combined with both reinjection and surface disposal methods for the geothermal effluents.

DRUMMOND, KENNETH J., Mobil Oil Canada, Calgary, Alberta, Canada

#### Northeast Quadrant Mapping, Circum-Pacific Map Project

The Northeast Quadrant panel, comprising geoscientists from Mexico, Canada, U.S.A., Central America, and Hawaii, was originally organized under the direction of C. A. Burk in 1973. He was succeeded by K. J. Drummond in 1976. For the Northeast Quadrant, compilation of all maps at a scale of 1:10,000,000 is under way with the cooperation of all countries involved.

Published maps ready for display include the Geographic map and the Plate-Tectonic map. The latter shows the active lithospheric plates, their boundaries, and associated geologic phenomena. Present day movements are illustrated by seismicity, volcanism, and plate motion vectors. These, with spreading axis and magnetic lineations, demonstrates how the present configuration of continental masses and oceanic basins evolved through interaction of the various plates. Preliminary color proofs of other maps are also ready to be displayed. These include Geologic, Mineral Resources, and Energy Resources maps. The Mineral Resources map has been prepared under the direction of Phil Guild, U.S. Geological Survey, with major contributions from Ken Dawson, Geological Survey of Canada, and Bill Salas, Consejo de Recursos Minerales, Mexico. This map depicts the geographic distribution of mineral deposits by symbol which show the class, size, and age of mineralization, overprinted on a geologic/tectonic background. The Geologic map attempts to show the relationship between continental and oceanic regimes.

Numerous elements for the Tectonic and Geodynamics maps have been compiled and work copies of this material can be viewed. These include preliminary tectonic maps, gravity and magnetic compilations, geothermal and heat flow data, crustal thickness, etc.

The Northeast Quadrant panel welcomes suggestions and corrections from all interested geoscientists.

DRUMMOND, KENNETH J., Mobil Oil Canada, Ltd., Calgary, Alberta

#### Regional Trends and Tectonic Framework, Northeast Pacific

Regional compilation of geology, tectonics, gravity, magnetics, and physiographic and oceanographic data have been prepared for the Northeast Quadrant of the Circum-Pacific Map Series. The maps clearly show the gross structural pattern from the cratonic interior, through platform deposits, orogenic belts, and continental shelf and slope to the deep ocean. Three major areas with a basic structural pattern can be identified: the cratonic interior, the Cordilleran orogene, and the Pacific Ocean.

From the shield, under the bordering platform cover, and throughout the Cordillera, a dominant northeasterly structural grain is clearly evident on regional maps, particularly gravity and magnetics. These trends are interpreted to represent fundamental structural features, old lines of weakness of the crystalline basement which had a varying controlling effect on the structural development of the Cordillera. Also, as the Pacific margin developed through time, this dominant trend was propagated westward and upward, overprinting its control on the younger trends.

The northeast Pacific Ocean has a very distinctive pattern of spreading centers, fracture zones, and magnetic anomalies. The most dominant structural feature is the east-northeast-trending fracture zones. The Pacific margin of the Americas consists of various blocks of post-Triassic accretionary terrane. Structural trends, volcanism, earthquake epicenters, and crustal thickness suggest a transverse segmentation of the Cordilleran orogene. The accretion and segmentation are believed to be a result of the interaction of the Americas and Pacific plates with an inherited east-northeast structural grain overprinted on the younger orogenic trends.

DURBAUM, HANS-JURGEN, Fed. Inst. Geosciences and Natural Resources, Hannover, Federal Republic of Germany

#### SEATAR-Related Geophysical Studies of BGR in the Southwest Pacific

Three geophysical surveys were carried out during the period from 1977 to 1981, as a German contribution to the SEATAR (Studies in East Asian Tectonics and Resources) program, in cooperation with CCOP-member countries and Australia. The surveys, using the R/V *Valdivia* and R/V *Sonne*, were in the Sulu Sea, the Makassar Straits, the Arafura Sea, Wharton Basin/Northwest Australia, and in the Coral Sea.

Diapiric structures in the northwest Sulu basin are probably of volcanic origin. In the North and South Makassar basin a sedimentary record exists which is more than 16,000 ft (5,000 m) thick and can be divided into five depositional sequences.

The subduction of continental crust from the Aru shelf/Arafura Sea, beneath the Aru Trough, is associated with intensive normal faulting of Pliocene to recent age.

In the Argo Abyssal Plain of northwestern Australia, a complex of dipping reflectors has been observed beneath basaltic sills and flows of Upper Jurassic age.

In the Coral Sea, the new information has significantly increased our knowledge of the change from continental to oceanic crust around the margins of the Coral Sea basins, and has implications for the development of rifted margin in general.