displacement since mid-Tertiary time south of its intersection with the Palaeo-Tethys, yet only about 25 km of motion is documented south of that junction (at least) since Pliocene time (just west of 100 km). The amount of relative motion appears to be increasing westward across the entire belt, with the largest relative motion appearing to be in the western part of the belt, where the boundary between the Palaeo-Tethys and the Indo-Australian plates is located. This has resulted in the formation of the Sunda Arc, which is located on the western margin of the Indo-Australian plate. The relation between the Pliocene and Holocene features seems to be limited to the north or limited to the southern part of the Indo-Australian collision zone (segments of escape).
gravity over a few seamounts. The lithosphere in the Superwell region of today has been shown to be thermally weakening through producing seamounts with lower-than-normal elastic plate thicknesses. On the Darwin Rise, mean plate thicknesses are lower than those found on ridge crests, providing evidence for a lithosphere that was also released around the time of the Mid-Cenozoic sea-level curve. Results of modeling of gravity derived thus far show lower-than-normal elastic plate thicknesses. To, in accordance with plate tectonics, interpreted by extracting from the earlier regional study conducted using satellite altimetric and distance measurement.

The analysis of gravity data over the Japanese, Wake, and Mid-Pacific islands has been found to require precise bathymetric data. Although about one-third or more of the total crustal thickness is due to the bathymetric component, we do not have reliable answers. By using Seabeam data collected on R smaller bathymetric features can be defined, and other features with more consistent results. The RMS differences between real and synthetic lines grided against elastic plate thickness and depth parameters provide a good constraint to Te values and a moderate constraint to depths. Te values obtained over individual gravity by these methods have been in agreement with both suggestions in the gravity of a flexural arch and the earlier modelling from satellite data, we also see the effect of lower density in the rem fibs.

Tzag-10 1500H
Subsidence Records from Pacific Atolls and Islands
Barbara H. Keating (Hawaii Institute of Geophysics, University of Hawaii, Honolulu, Hawaii USA 96822)
Seismic reflection profiles were examined from 300 to 600 km below the sea floor between Loihi Seamount (at the nearly active end of the Hawaiian seamount chain) and Midway Island (halfway to the Mariana Trench). Details of deep trenches, ridges, and other topographic features are visible in these images. Many of these features are influenced by tectonic processes, and their study can provide important insights into the dynamics of the Earth's crust. The images show the complexity of the seafloor structure and highlight the importance of understanding its evolution.

Tzag-2 1650H
Roughness of Regional Seafloor Depths in Seamount Provinces
Walter H. Smith and A. B. Watts (Lamont-Doherty Geological Observatory, Columbia University, Palisades, NY 10964)
Estimates of the regional depth of the seafloor are of fundamental importance in plate tectonics. The subsidence due to cooling of the lithospheric thermal boundary layer explains the first order relationship between depth and age, and regional depth estimates are used to determine an empirical subsidence law for the cooling plate. Departures from this expected subsidence (depth anomalies) are thereby defined and may be interpreted in terms of epiphenomenal motions and/or thermal regressions caused by hotspot volcanism and/or mantle convective rolls.

We derive regional depth estimates directly from shipboard bathymetric measurements. These data have intrinsic errors which we evaluate by a variety of analytical errors. We find that systematic errors in some cruises can be correlated. After correction, the median absolute COE in well-surveyed regions of the deep ocean is about 150 m.

Estimates of regional depth is complicated by the presence of seamounts, which contribute bathymetric data shallower than the regional age as defined by the two-pass globally. Averaging or removing the depth measurements is biased by these shallow values and may not yield reliable estimates of the regional seafloor depths in seamount provinces. We have developed a filtering procedures which use one-dimensional techniques including Li norm to predict the values of the seafloor in the presence of contaminating "outliers" (the seamounts), and also to yield confidence limits on these estimated values. Regions with additional processing which has a smoothing effect on the data. Our method improves by a factor of ten. These improvements are significant and can therefore be used to estimate the volumes of seamounts and other features which are observed the regional seafloor.

Tzag-5 1400H
Collision Induced Fractures: Modern and Ancient
P. V. Cambray and J. F. Stock (Dept. of Geol. Sci., Michigan State University, East Lansing, MI 48824-1115; 517-335-1626)
Sublapse is thought to be a major force in determining the distribution of plate motions. Irregular or oblique convergence is the most likely force responsible for the formation of the new trenches. These collisions with other tectonic forces can be particularly significant when the arrival of buoyant material at the trench results in convection. The common proximity of transform faults and fracture zones to subduction complex suggests that they are more likely to develop along these structures. The presence of these forces may explain the magnetic and seismic anomalies associated with subduction zones.

Tzag-6 1350H
On the Initiation of Subduction
S. Mooney and J. R. Phillips (Department of Geological Sciences, SMU, Dallas, TX 75275)
Estimates of shear resistance associated with incipient lithospheric thrusting allow the establishment of lower bound forces for the generation of subduction. These environments are currently the most likely to be involved in the formation of new subduction zones. There are some uncertainties regarding the shear stress, and these uncertainties can also be expected to affect the calculated results. For example, the calculations suggest that some of these are likely to be triggered by very small changes in the stress field. The calculated results therefore should be treated with caution.

Tzag-7 1300H
Anese South America Subduction Zone
S. W. Donaldson and B. J. O'Connell (Dept. of Earth and Planetary Sciences, Harvard University, Cambridge, MA 02138)
Numerical evolutions of viscous flow models of subduction zones are used to investigate Andean tectonics. The tectonic activity of the Andes extends over a wide region, and is characterized by large scale extension and compression in close proximity: extension is the foreland, near the trench, and compression further inland. The Andes are a complex system of compressional and tensional forces that interact with the subduction process.

We use a strain viscosity flow model of the uppermost 700 km of the earth to calculate numerically the velocity and strain rate fields within the Andean subduction zone. This model is based on the idea that the viscosity is power-law which depends on the continental lithosphere, and further flow in the subduction zone.

Tzag-8 1550H
Subduction of Oceanic Mantle: Geology, Geophysics, and Tectonics
Robert C. Oxburgh and T. T. F. Weierand (Univ. of Washington, Seattle, WA 98195)
Various mechanisms of subduction zone evolution are discussed, including implications for plate tectonics and the dynamics of the Earth.

The problem of subduction and slab instability is one that poses a significant challenge to our understanding of the Earth's structure and dynamics. The subduction of oceanic crust into the mantle beneath the continents leads to the formation of subduction zones, which are sites of significant tectonic activity. The stability of subducting slabs is influenced by a range of factors, including the physical properties of the subducting slab and the thermal structure of the mantle.

The subduction slab generates a small-scale circulation of the astenosphere beneath the slab and the overlying continental gravitational system. The slab is supported by the buoyancy of the sediments filling bed relief and the pressure of the water mass underneath. At this stage, convection is driven by a temperature gradient from the subduction zone to the mantle wedge.

The calculations of the convective system are used to infer the forces that govern the deformation of the subducting slab near the trench and are balanced by these traction forces in the opposite direction, which are caused by the asthenospheric flow within the subduction zone.