starting with the planned December 2008 launch of NASA's Glory mission, but there are no plans yet for obtaining the data beyond that time.

NOAA Administrator Vice Admiral Conrad Lautenbacher, Jr., said that the review of the NPOESS program had attempted to maintain continuity of data currently collected while minimizing potential for gaps. However, "difficult choices and tradeoffs had to be made," he said.

Pietrafesa noted that choosing to concentrate on weather observations over climate "does buy some time for NOAA to cover any gaps in the [climate] data," which is not as time sensitive. In addition, space was left on the NPOESS satellites for the lost sensors if a sponsor for them can be found. However, the science communities affected by the loss of these sensors are "very concerned," he said.

Greater Oversight

The problems that led to these changes in the NPOESS program have also resulted in changes in management and oversight. Key managers have already been replaced, and the main contract with Northrop Grumman will be restructured, according to Lautenbacher.

Science Committee Chair Rep. Sherwood Boehlert (R-N.Y.) said that he intends to hold more hearings on NPOESS so that the committee can closely watch over the program's progress. In addition, Pietrafesa said that the NOAA Science Advisory Board will review the changes to NPOESS and proposed contingency plans at its next meeting in July.

—SARAH ZIELINSKI, Staff Writer

Chronology of the Baikal Rift System

PAGES 246, 250

The deepest lake in the world, Lake Baikal, Russia, lies on the intracontinental Baikal Rift system (BRS) along with the nearby Lake Khubsugul in northern Eurasia. Many questions connected with the history of the development of BRS remain open, in particular the time and causes of the formation of the recent BRS morphology. Thus, the rate of the Indo-Asian collision, and the discovery of mantle plume intrusion on the large area of Northern and Central Mongolia and on the TransBaikal area in the vicinity of the rift, have been subjects of hot debate throughout the past 50 years of research on the formation of the intercontinental BRS.

Studies by the authors of this article have focused on the southwestern BRS, particularly the Khubsugul Rift. Because of its submeridional trend, the Khubsugul Rift is believed to manifest various reactions when parameters of the tectonic stress field change due to the influence of the Indo-Asian collision in forming the northeast compression impact or of mantle plume intrusion that forms the northwest extension stress field.

Since 2002, an international team of scientists from Russia, Mongolia, and Belgium has conducted a joint integration project of the Siberian Branch of the Russian Academy of Sciences and the Academy of Sciences of Mongolia. As part of this project, they have constructed an uninterrupted sedimental age database to reconstruct a more complete succession of tectonic events, based on data obtained with about 400 kilometers of seismic profiling and deep drilling of bottom sediments of Lake Khubsugul, as well as on analysis data on displacements recorded from tectonic fractures and faults. Initial results, including an encapsulation of derived tectonic history, are presented here.

Two tectonic macroregimes are suggested by the structure of the sedimental cover of the Khubsugul Rift (Figure 1a). The first tectonic phase (from ~5.5 to ~0.4 million years ago) was highly active; within that period, the rift was intensely shaped into the recent pattern, and rifting was accompanied by separation and uplifting of its shoulders, both processes taking place at high rates.

The above is indicated by the observation that the bottom sediments are inclined at angles of 10º–20º toward the basin's center as well as by abundant syngenetic faults. The fault kinematics at the early stage of the development of the southwestern BRS suggest that the faults developed under the northwest extension [*San'kov et al.,* 2003].

The northwest stress field was most likely caused by divergent movements along the southeastern margin of the Siberian Platform at the background of the mantle plume intrusion, which is evidenced by both the regional anomalous gravity field [*Gao et al.,* 1994] and abundant volcanic rocks in the Khubsugul depression [*Rasskazov et al.,* 2003]. The commencement of the basin's formation may be attributed to the period of valley basalts intrusion, which occurred 10.0–8.0 million years before present (B.P.) [*Rasskazov et al.,* 2003]. The period of active Khubsugul Rift development (5–3 million years B.P.) coincided with the period of intense mountain formation in Central Asia, the latter being attributed to the compression impact of the Indo-Asian collision [*England and Molnar,* 1997]. Additional northeast compression intensified extension in the Khubsugul Rift zone (Figure 1b), yet later on extension processes ceased in development.

Since about 0.4 million years ago until the recent time, the downward bending of the rift basin slowed (Figures 1a and 1b). It is widely known that the denudation rate is of linear dependence on the velocity of tectonic uplifting. If the delivery of terrigenous magnetic minerals from the catchment basin into the lake can be considered to be an intensity marker of denudation processes, then results show that lower extension rates after about 0.4 million years ago caused the denudation rate to reduce, as suggested by an abrupt decline of the delivery of magnetic grains in the bottom sediments (Figure 1c), in comparison with the previous

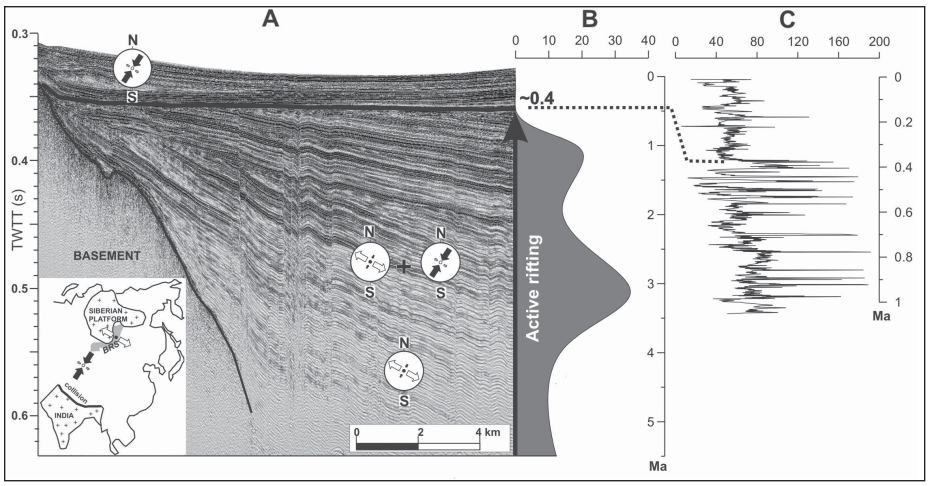

*Fig. 1. Transformation of the tectonic regime of the Baikal Rift system (BRS). (a) Fragment of the east-west seismic profile of the bottom sediments of Lake Khubsugul. Sediments accumulated under the northwest-southeast extension regime (lower part of the cross section), and those which formed under transpression regime with northeast-southwest compression (upper part of the cross section) are separated by a bold black line. The scheme shows the distribution of the recent tectonic stress field in the region. (b) Index of tectonic activity log(a)^b, where a is angle of inclination in seismic units and b is number of syngenetic faults in each unit. The age scale is plotted on the basis of linear extrapolation of the timeline from bore core KDP (Khubsugul Drilling Project)-01 obtained from the bottom sediments of Lake Khubsugul [*Fedotov et al., 2004]. (c) Magnetic susceptibility (10^{-5} SI units) of the KDP-01 bottom sediments. The dashed line marks a transfer from high to low denudation rates for the watershed basin.*

tectonic phase. This likely resulted from the completed transition to the transpressional regime of crustal deformation.

In the southwestern BRS, the late Quaternary and recent faults were formed under the impact of the northeast compression [*San'kov et al.,* 2003; *Arjannikova et al.,* 2004]. The field of such stresses induced the Khubsugul Rift to open slowly and passively at its northern termination due to the clockwise rotation of the eastern block, as evidenced by the almost horizontal position of the bottom sediments which were accumulated during the given period (Figure 1a). Because of the remote impact of the Indo-Asian collision, which was persistently strengthened, the entire territory of the western part of the Mongolian-Siberian mountainous belt adjacent to the Siberian Platform was subject to the described tectonic regime. Meanwhile, the northern BRS was intensively extended.

On the basis of available data, it is believed that during its initial stages, the development of the BRS was related to the divergent movements of the Amur plate (which covers the TransBaikal area, East Mongolia, Manchuria, and the Korean Pen-insula) along the southern margin of the Siberian Platform, superimposed on mantle plume intrusions. In the Pliocene-Quaternary period, between 5 and 3 million years ago, rifting was enhanced as a result of the interaction of extension due to the mantle plume intrusion and compression due to the Indo-Asian collision. Further increase of compression in the rift basins of the southwestern BRS made the extension cease, and in the Pleistocene about 0.4 million years ago, the tectonic regime in the area under study was converted.

The data obtained indicate that the influence of the Indo-Asian collision could not have solely caused the active formation of BRS structures. The activation of rift processes could have been possible only in combination with the strongly regional influence of the mantle plume.

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LETTERS

On "Carrington, Schwabe, and the Gold Medal"

PAGE 248

I note with interest the article by *Cliver* [2005] about the early solar investigations of Heinrich Schwabe and Richard Carrington and offer some further insights into Schwabe's work and its reception at the time.

Schwabe commenced his observations in 1826 with a small telescope he had bought some years earlier. For more than 40 years, he observed the Sun and made meteorological notes. In his 1843 essay, he noted a sunspot cycle of about 10 years, but his result aroused little interest with contemporary astronomers. Research at the time was focused on the physics of the planets, the Moon, and other topics. Schwabe had published his data in the well-known Astronomische Nachrichten, but not until Alexander von Humboldt republished it in his *Kosmos*, volume 3 (1851), did the data begin to be recognized and accepted by Schwabe's fellow scientists. Humboldt's *Kosmos* was a publication of considerable prestige, and it had a wide circulation among scientists and the educated public. Schwabe's work became familiar to other scientists including Carrington, Angelo Secchi, and Gustav Spörer and, as noted by Cliver, earned him the gold medal of the Royal Astronomical Society.

Another point is relevant. Rudolf Wolf, director of the Berne (Switzerland) Observatory and a mathematics teacher, also took account of Schwabe's results. In 1851–1852, the relationship between solar activity and the Earth's magnetism was already recognized, and Wolf concluded that the length of the solar cycle was 11.111 years and that the next solar minimum should occur in 1855. At the end of the eighteenth century, Johann Wilhelm Ritter had linked the occurrence of auroras to the solar cycle [see *Schröder*, 2004]. Ritter had noted the existence of a regular auroral period of approximately 10 years some time before Fritz and Wolf. Because Ritter did not have continuous sunspot and auroral data, he could not provide an exact formulation.

From the groundwork of Ritter, Schwabe, Wolf, and later Hermann Fritz, the complex relation between geomagnetism, the occurrence of auroras, and the solar cycle was gradually constructed.

Just after 1851–1852, Carrington commenced building his private observatory at Redhill (Surrey, U.K.). He noted the results of Schwabe and Wolf, and he commented, "I thought I could very well appropriate the solar spots to myself at Redhill for the next eleven years' period, estimated to begin in 1855 and end in 1866" [*Carrington*, 1863]. As correctly noted by Cliver, Schwabe eventually donated his scientific papers to the Royal Astronomical Society in gratitude for his gold medal. Schwabe gave his instruments to his school, as he worked alone and had no one to whom he could bequeath them.

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