Can earthquakes be predicted?

Doyle Rice, USA Today, 10-5-11

Predicting hurricanes is one thing, but forecasting when and where an earthquake will hit is something else entirely, and typically considered impossible by most scientists. But a new study has laid the groundwork for future research into the topic.

About 40 minutes before the devastating and deadly 9.0 earthquake that rocked Japan on March 11, a disturbance in the ionosphere above the area was recorded, according to a recent study.

The ionosphere is a region of the upper atmosphere that contains atoms ionized by radiation from the sun. It begins about 30 miles above the surface of the Earth.

The study, led by Kosuke Heki of Hokkaido University in Sapporo, Japan, was published in the American Geophysical Union journal *Geophysical Research Letters*.

Heki found that the total electron content (TEC) in the ionosphere above the center of the earthquake reached about 8 percent above the background electron content roughly 40 minutes before the quake occurred.

The increase in TEC was greatest above the earthquake epicenter and diminished with distance from the epicenter.

Heki also analyzed records from previous earthquakes and found that similar ionospheric anomalies occurred before the 2010 magnitude 8.8 Chile earthquake, possibly the 2004 Sumatra magnitude 9.2 earthquake, and possibly the 1994 magnitude 8.3 Hokkaido earthquake.

Although previous studies have shown that earthquakes could trigger atmospheric waves that travel up and disturb the ionosphere, it remains unclear how an ionospheric disturbance could occur before an earthquake begins.

Heki says that further research is needed to determine if disturbances in the ionosphere could be used to predict large earthquakes.