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Clouds Anomaly before Italy 6.0 Earthquake

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Introduction

In 1997 Russian scientist Morozova found some abnormal linear clouds above an active fault [1]. This is the first report that clouds may have some relation with geological activity. From 1999 Shou considered that some strange clouds were related with earthquake, and predicted some earthquakes according to the cloud precursors to USGS and got some success [2]. In 2008 Guo and Wang studied the cloud anomaly before Iran earthquake [3]. In that paper some strange clouds before Iran earthquakes are found. These clouds showed an abnormal pattern, they stayed over the main geology fault of Iran for hours, and did not move with wind. Until now none meteorological theory can explain this phenomenon. Several days or months later after the clouds appearance, the quakes happened close the clouds and the faults.

On one hand, earthquake short time prediction is considered extremely difficult and controversial; on the other hand, many scientists try to study the anomalies before earthquake, such as the ionosphere TEC anomaly before China, Japan, Indonesia and Haiti earthquake, thermal anomaly before India, Iran, China and Italy earthquake, Rn and ULF anomaly before Japan earthquake. Nearly all the anomalies were reported after the quake, not before the quake, and this lead to questions why people can not predict earthquakes according to these anomalies. Here we reported an earthquake prediction example according to satellite cloud image. Such kinds of work are seldom reported. A possible reason maybe that Scientists are limited in different disciplines, meteorologists who are familiar with geostationary satellite image did not study earthquake activity, and geologists who are familiar with earthquake activity did not study meteorology activity. This awkward situation leads to little progress in earthquake prediction research.

Data and Method

Here geostationary satellite image with 1 hour temporal resolution is used. Its resolution is enough to monitor the cloud continuous movement. Polar orbit satellite data such as AVHRR or MODIS can not do this, because their temporal resolution is about 12 hours, and sometimes the cloud anomaly exited less than 10 hours. So they will not detect such anomaly. In current preliminary stage there is no formula or

equation can be used to quantify such cloud anomaly. Our new developed method is combining the cloud image series into a computer animation, and then run this animation, in the normal situation, the cloud will move fluently in the sky, but when the clouds are affected by an active fault, the clouds shape will change and pause sometime, while the normal cloud is still moving. According to this change we can identify the abnormal clouds.

The Italy earthquake Prediction

On April 22, 2012 a cloud appeared over east of Italy. Figure 1 showed the cloud movement from April 22, 18:00 UTC to April 23, 02:00 UTC. The straight linear cloud appeared at April 22, 18: UTC, it spread from central Italy to south Italy, about 200km long, and move to the east. At 20:00 UTC, the cloud become wider, while its left edge is still there and did not move. At April 23, 00:00 UTC, the left edge is very clear and it looks like cut by a knife. It stayed there for about 8 hours, and did not move with winds. In the whole Europe, all the clouds are moving except this linear cloud over Italy. A similar but small cloud also exists over north of Greece. We know that in the normal situation, the clouds should move with winds continuously, while in this image, the cloud stayed there and did not move with winds. It looks like an underground cloud source existed along the straight line. We consider this means that the underground geological activity is becoming active, and according to this anomaly we made this prediction: "according to the satellite data, I predict there will be M5.5-M6.0 quake in Italy. If M5.5, it is about in 10 days, If M6.0, it is in 30 days. I am trying to reduce the location error, but my data is limited." This prediction was sent to a researcher of Italy's National Institute for Geophysics and Vulcanology Angelo De Santis and Hattoti Katsumi, professor of Chiba University, Japan on April 23.

The M5.5-6.0 magnitude estimation is based on the large area of the cloud anomaly, because it appeared in Italy and north Greece, and it is about 200km long in Italy. The date is based on our experience in Iran and China. The only bad one is epicenter. Due to the large area of cloud anomaly, it is difficult to predict the future epicenter. So we try to get some filed measurement data, such as Rn or Ground water data from Italy to estimate the epicenter. But we failed. On May 20 a M6.0 quake occurred at 44.800° N, 11.192° E, and a M5.8 quake occurred at 44.814°N 11.079°E on May 29. A interesting point is, a M5.6 quake occurred in Bulgaria at 42.686° N 23.009° E , 2012-05-22 (see Figure 1). It is very close to the small cloud anomaly which located North Greece. And from 1970 to current time, there are only 9 quakes which are bigger than M5.0 occurred in Bulgaria area. So it is hard to say that this M5.6 quake is a coincidence with the cloud anomaly.

References

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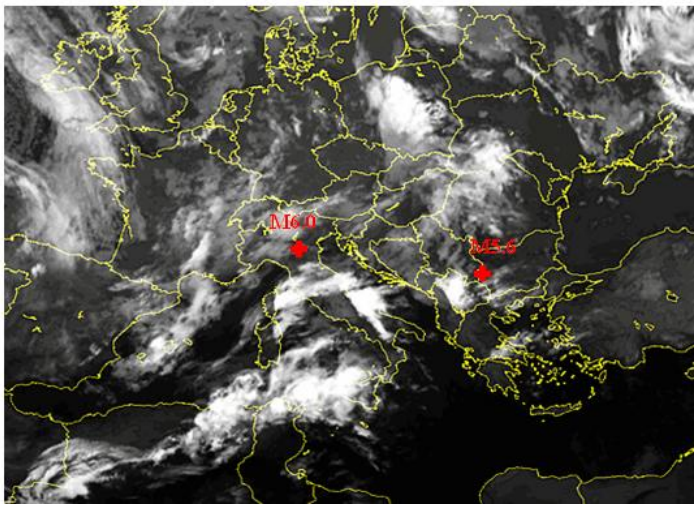

Fig 1. Straight linear cloud over Italy and Bulgaria on April 23