The Earthquake can be Predicted using Satellite Thermal Infrared Images

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Chinese have carefully recorded earthquake data for the past several thousand years.

- In 782 B.C. (The Chou Dynasty while King You ruled China), "There was severe drought, then big earthquake: rivers were cut off, mountains were shaken.“

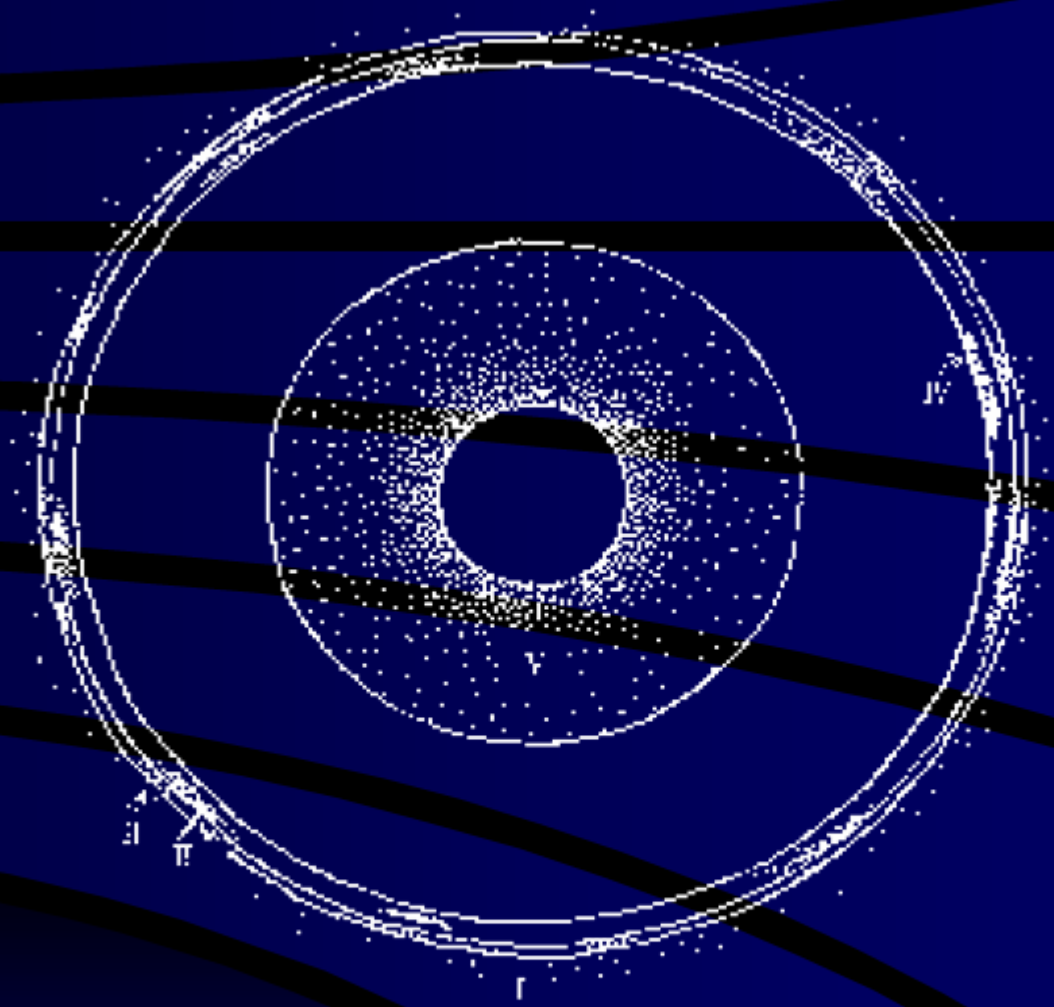
- Historical earthquake data has shown that pre-earthquake temperature increase occurred before about one third of the earthquakes recorded by ancient Chinese.

- Russians, Dr。V 。Gorny.，A。Salman.. etc., were among the first to discover the isolated pre-earthquake thermal-infrared temperature increase anomaly using satellite technology in 1988.

Temperature Increasing Mechanism of Satellite Thermal infrared

- Five gas-spheres of the earth

Five gas-spheres of the earth



1,atmosphere;2,upper crust gas-sphere;3,middle crust-sphere;4,upper mantle gas-sphere;5outer core gas-sphere

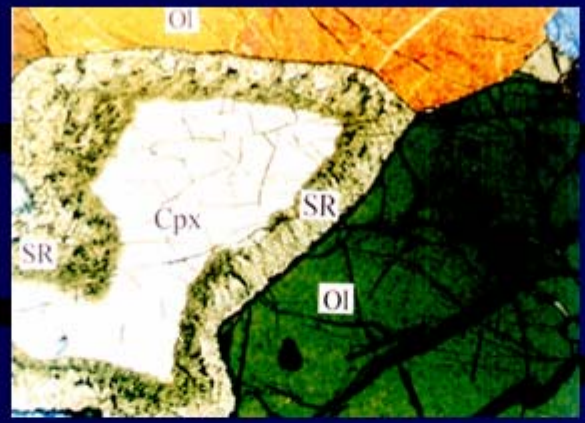
（After DU Letian

Temperature Increasing Mechanism of Satellite Thermal infrared

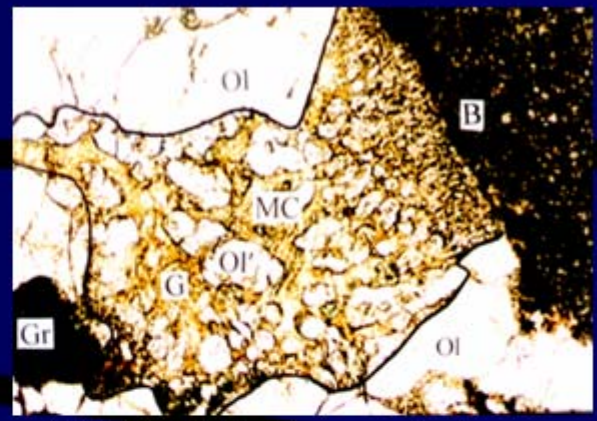
- Ulcerated bodies in the seismic zones

Gas Inclusions in Basalt in which always take place earthquakes

Melt Cell,Lherzolite,Xixia,Shandong.GOD-Glass,Olivine,Diopside;Olivine and Cr-diopside grains on the wall of melt cell

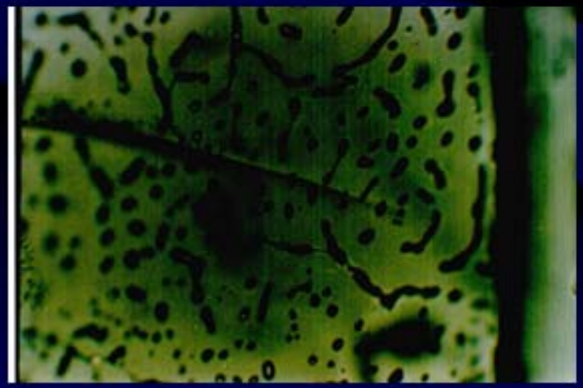


Sponge edge(SR) were alterated from dioside(Cpx);Ol-Olivine

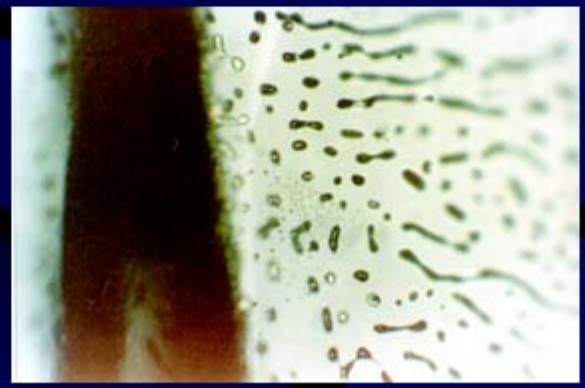


MC-Melt Cell;OL-These crystalls of minerals were crystallized from melt,olivine secondary.OL-primary olivine

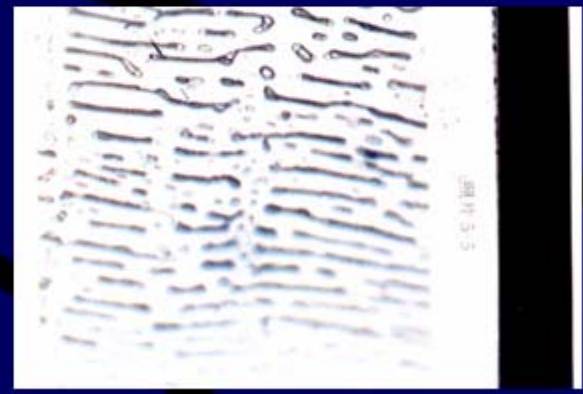
Gr-garnet;B-Basalt Orthopyxogen was transformed to melt cell



Gas inclusions in basalt



Gas inclusions in Lherzolite,Zhang-Jiakou



Tube gas inclusions in Lherzolite,Zhangjiakou

After Du Letian

he depth of upper mantle conductive layer in the Chinese mainland(km.)(After Xu C

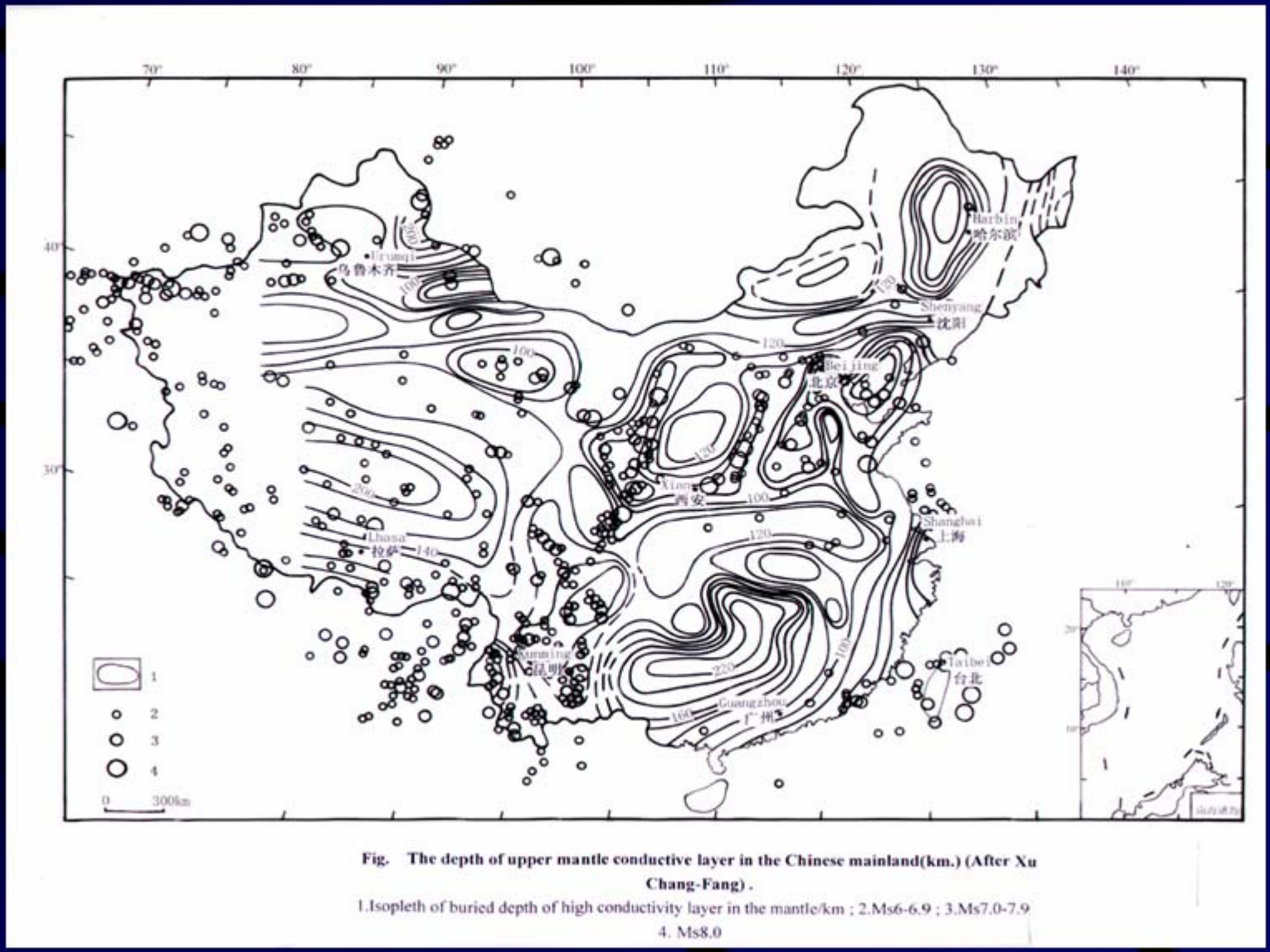
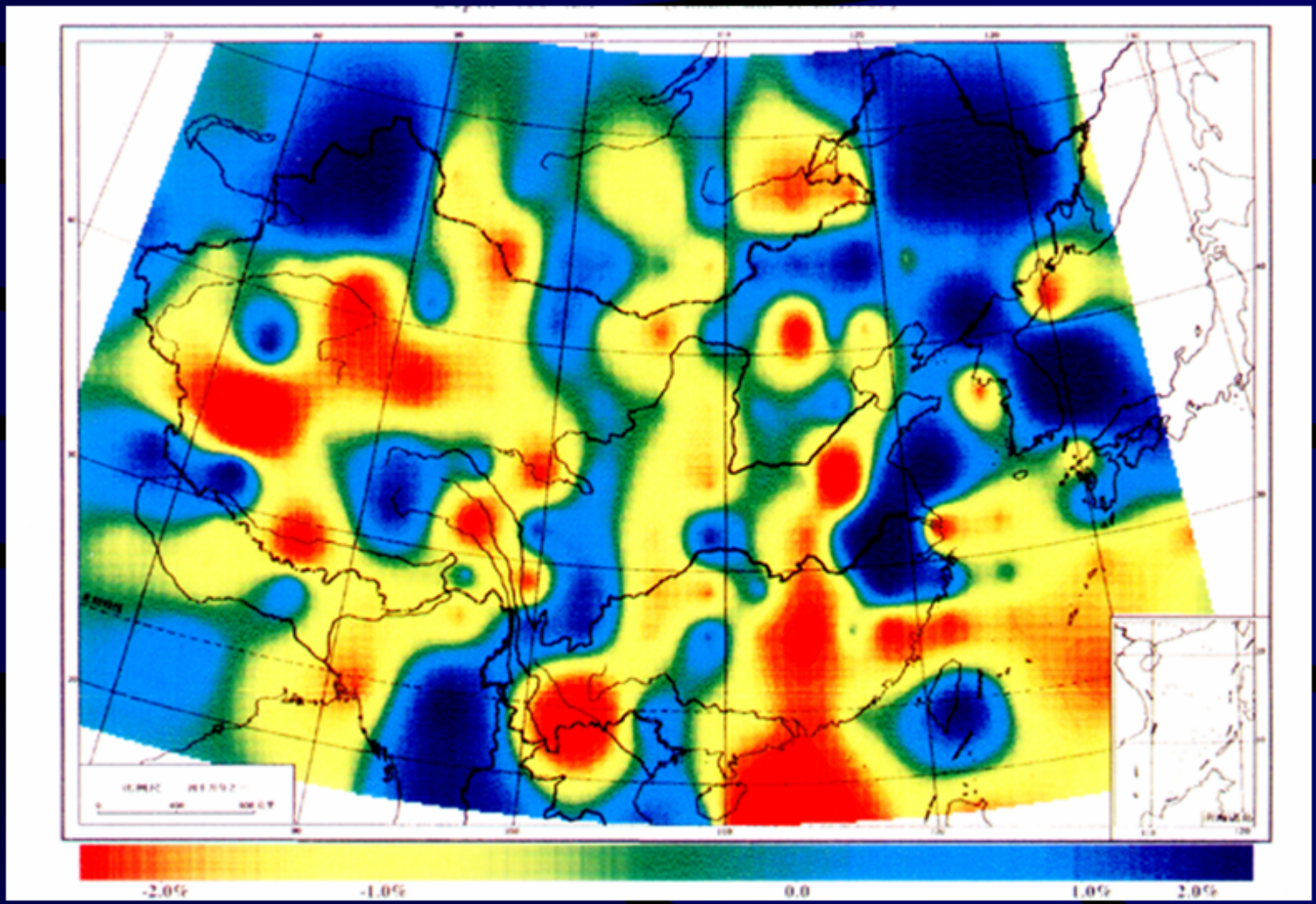


Fig. The depth of upper mantle conductive layer in the Chinese mainland(km.) (After Xu Chang-Fang).

1.Isopleth of buried depth of high conductivity layer in the mantle/km ; 2.Ms6-6.9 ; 3.Ms7.0-7.9 4. Ms8.0

Seismic Tomographic Image in The Depth of 400Km.(After Liu.F.T.)



Deep Structure Profile in Chinese Mainland (After Liu G.D.)

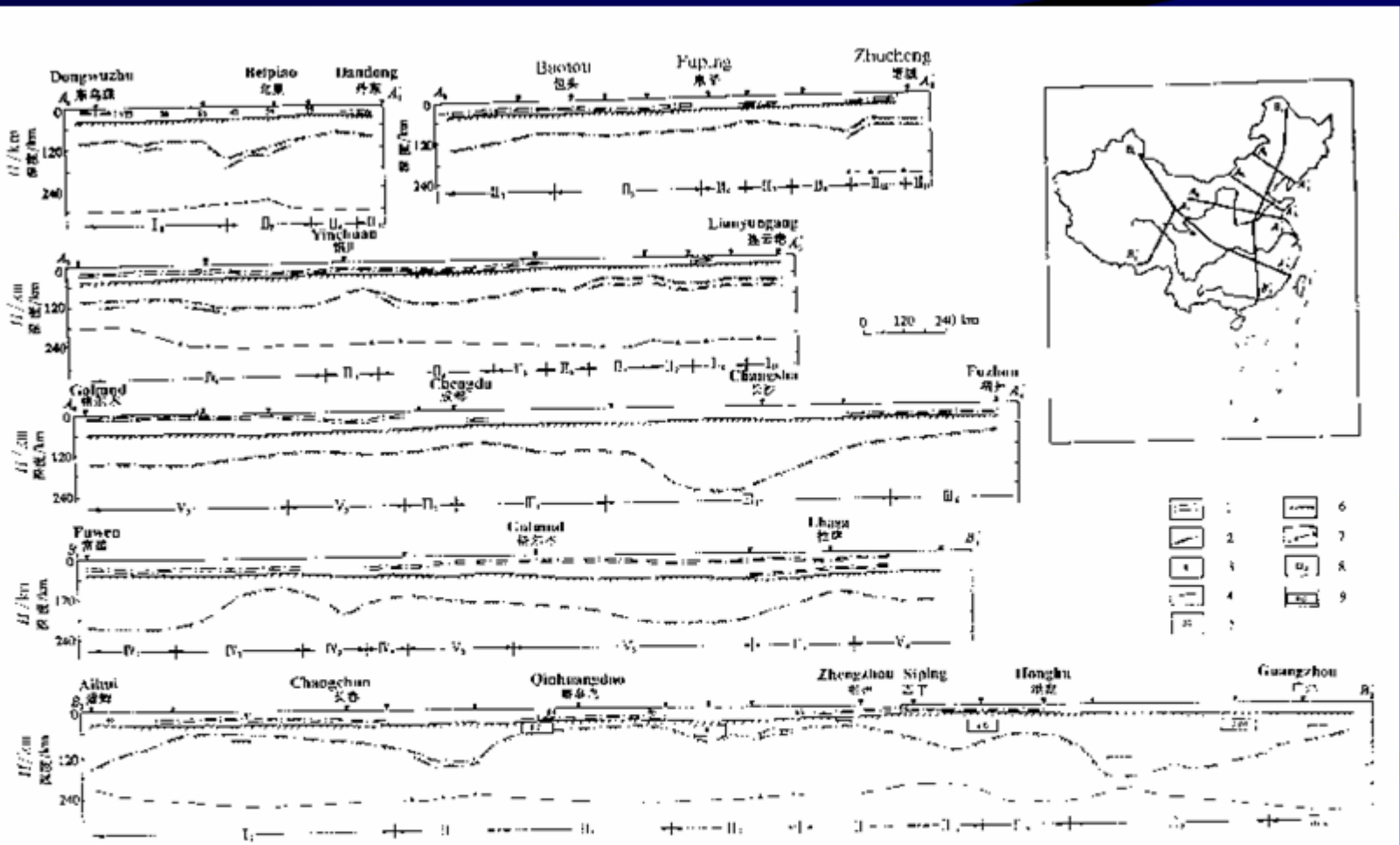


图 1 中国大陆深部构造剖面图（据刘国栋 1994）

Deep structure profile in Chinese mainland (After Liu Guodong)

1.壳内高导层 crustal conductive layer 2.上地幔第 1 高导层 first conductive layer of upper mantle 3.地名 place name4.低速层 the low velocity zone 5.热流值 /heat flow value/mW.m^{-2} 6.莫霍面 Moho 7.上地幔第 2 高导层 second conductive layer of upper mantle 8.深部构造分区 province of the upper mantle 9.纵波速度 p-wave velocity/Km.s^{-1}

Active Plates,Subplates and Blocks in China and Neighboring Areas

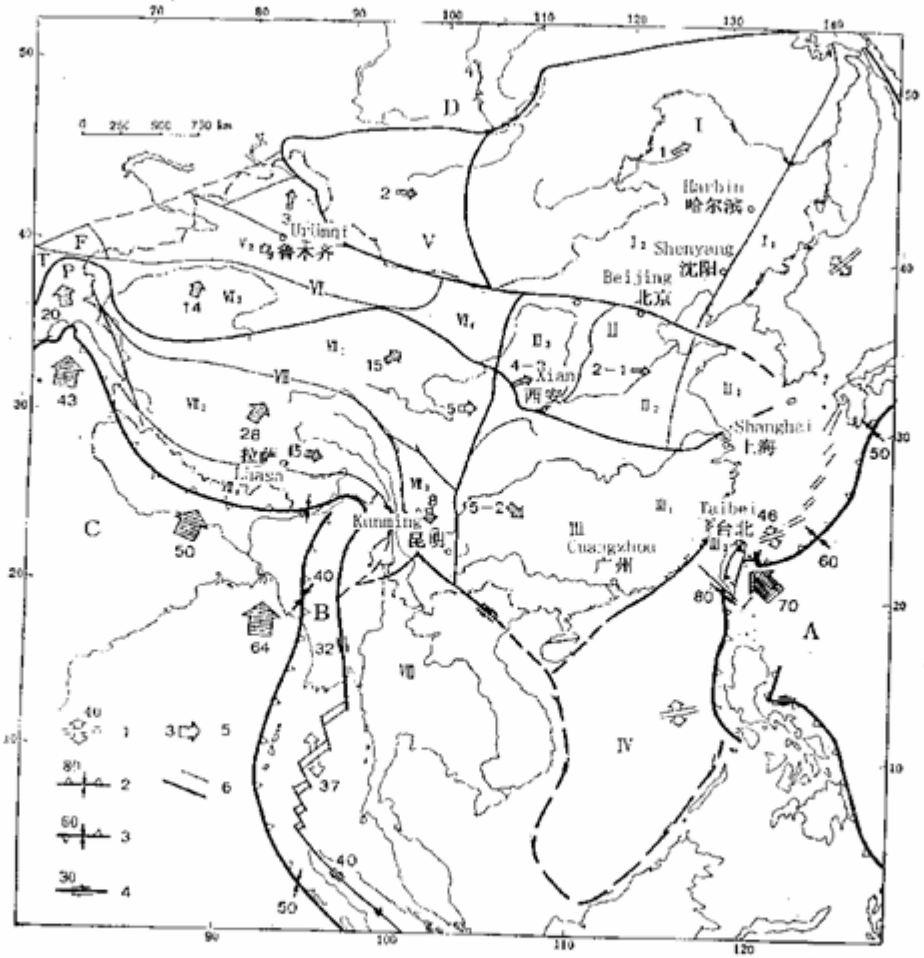


图　中国及邻区活动板块、亚板块与块体划分

Active plates,subplates and blocks in China and neighboring areas

1-4 为活动板块相对运动矢量及速率，毫米/年，**Relative motion vectors and rate(mm/a) of active plates**（1 分离边界、扩张脊 divergent 2 俯冲边界 subduction 3 碰撞边界 collision 4 走滑转换边界 strike-slip and transform fault 5 板块绝对运动和亚板块、体块相对欧亚板块（西北利亚）的运动矢量及速率，毫米/年 **Relative motion vectors of subplates and blocks with respect to the Eurasion plate (Siberia Craton) and rate (mm/a)** 6 亚板块、块体边界 **Boundaries of the subplates and blocks** A 菲律宾海板块 Philippine Sea plate B 缅甸板块

Recent Tectonic Stress Field in China and Neighboring Areas

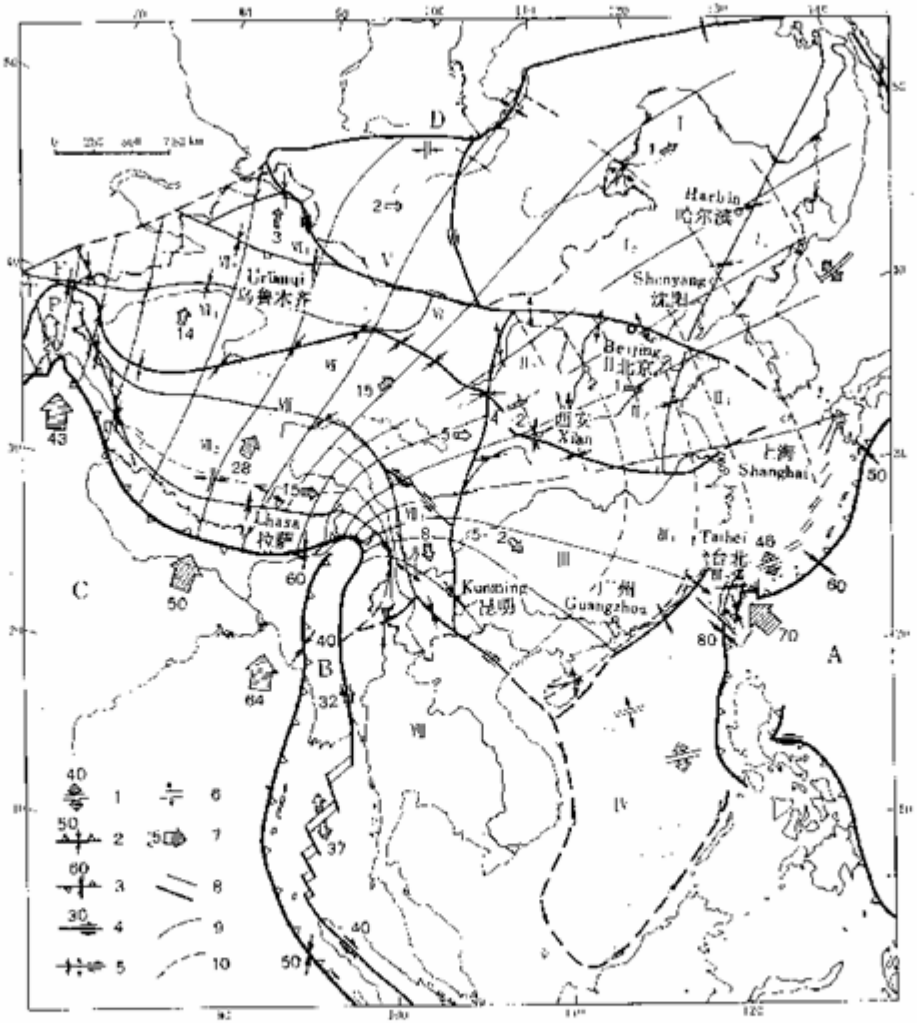


Fig. 14 Recent tectonic stress field in China and neighboring areas

1–8. as shown in Fig. 2; 9. Trajectory of maximum compressional principal stress axis; 10. Trajectory of minimum principal (tensile) stress axis

Active Tectonic of China(After Wang Y.P.)

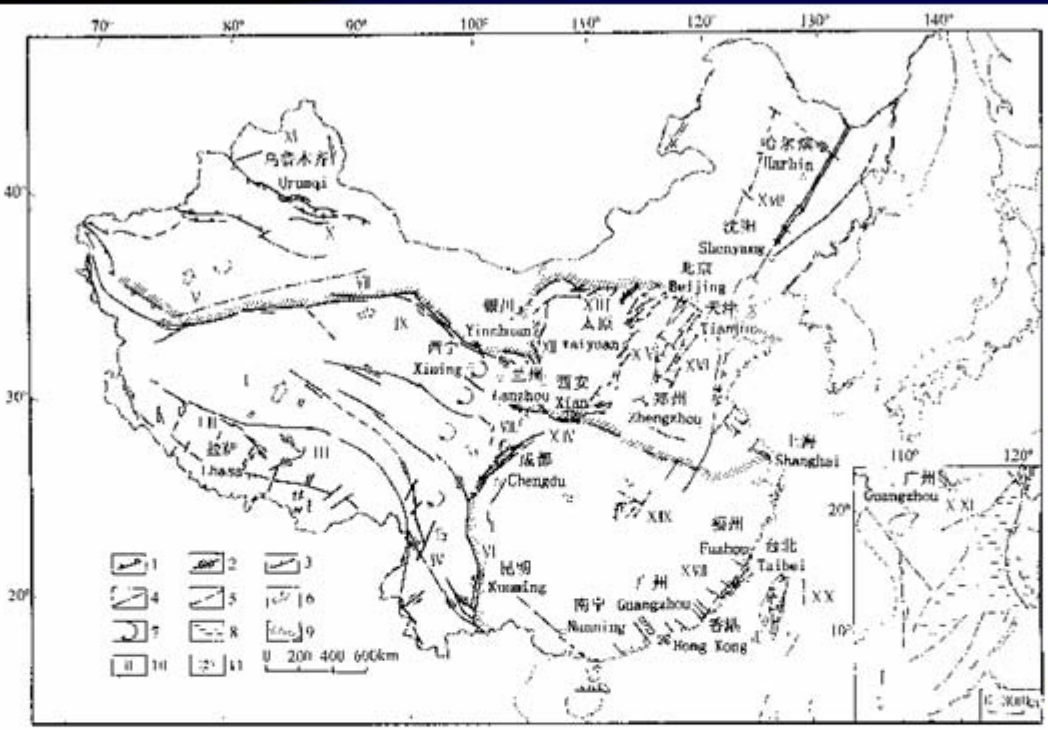


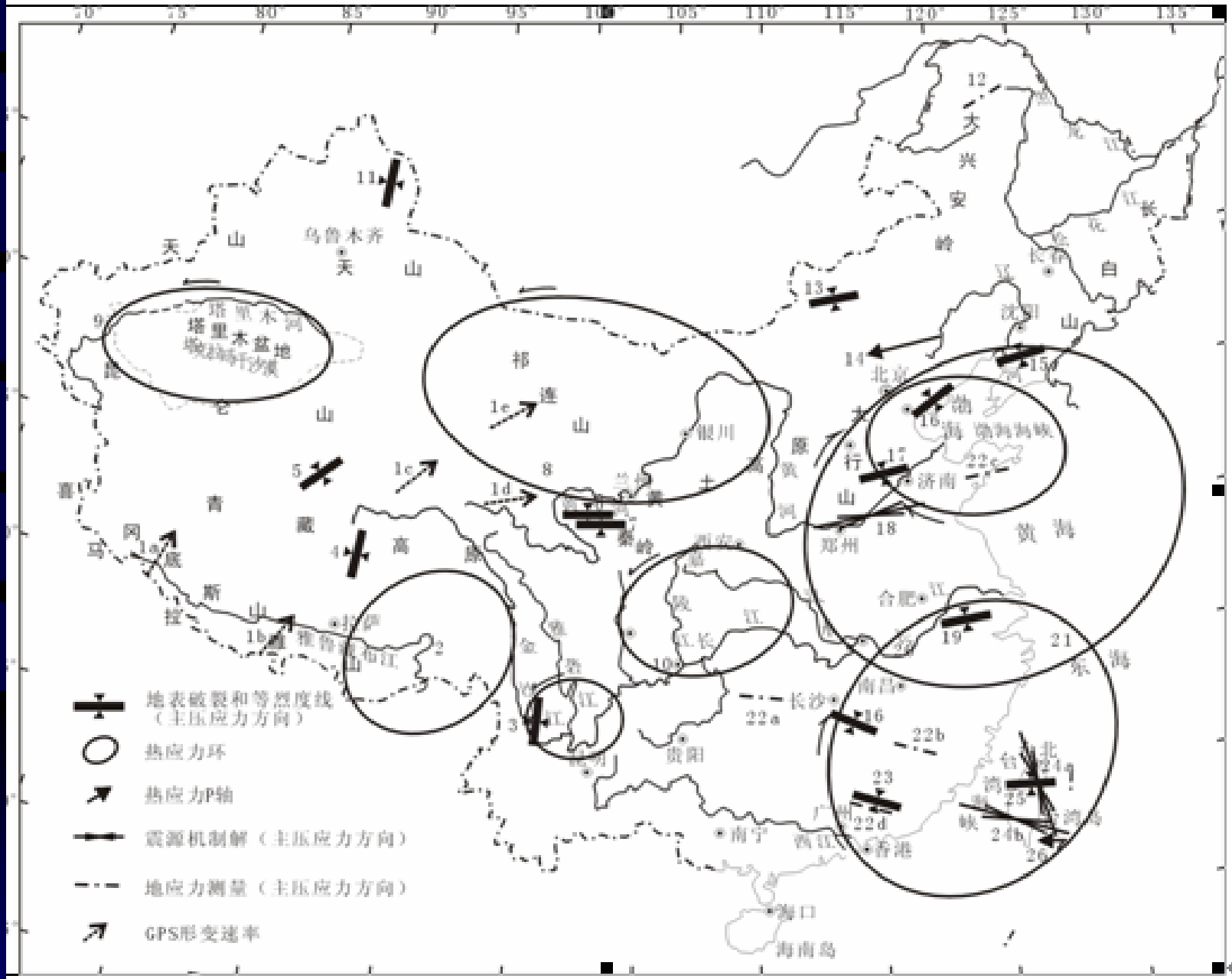
图 中国活动构造

Active tectonic of China (After Wang Yipen 1996)

1.逆、逆掩断层 Thrust or overthrust fault 2.走滑断层 Strike-slip fault 3.正断层 Normal fault 4.隐伏断层 Buried active fault 5.推测断层 Inferred active fault 6.块体运动方向 Direction of block motion 7.块体旋转 Block rotation pattern 8.洋壳盆地 Basin with oceanic crust 9.活动构造区边界 Boundary between active tectonic region 10.活动构造区编号 Active-tectonic region and its number 11.活断层编号 Active fault and its number

图 中国东部强震(M≥6.0)震中分布(1400-1985 年)

Epicenters of strong earthquakes (M≥6.0) in the eastern China (1400-1985) (After Ma Zuojin 1995)



图Ⅰ-3-1 中国现今构造应力图

Fig. Ⅰ-3-1 Modern structural stress of China.

Agenda

- Three Hypotheses of the Precursor of the Satellite Thermal Infrared Anomalies

(1)”Red Swelling” Hypotheses, by Academician Fu Chengyi,1971

1,The records of Guanting Reservoir Seismological Station, Beijing, are usually interfered by the high-frequency pulses produced by trains passing nearby bridge. But during the periods of Baotou earthquake of November 1970 and Changshan Islands earthquake of January 1971 with 5-6 magnitude, such interference disappeared. This phenomena
proves that before a middle strong earthquake, the affected area of the upper crust may stretch at least several hundred kilometers.

2,Before a lager earthquake ,the occurrences of small earthquakes in a relatively wide area decreased dramatically ,and transient pacific period appears.

3,Some earthquake precursors such as ground water anomaly ground tilt, crust strain, geoelectric resistivity, and anomalous animal behaviour sometimes may appear in places far from epicenter. If an earthquake was caused only by fracture of rocks ,such phenomena would occur magnificently only around the area near the epicenter.

4,Gravity of the moon and sun triggers an earthquakes sometimes. While the gravitational force is a kind of body force. It affects on rocks at both sides of a fault nearly equally. If earthquakes originated only
From a small area near a fault, it is hard imagine that the gravitational force could trigger an earthquake. Only when this force affects a very large volume of the crust, could the gravitation force produce enough distortion .

(2),The Gas-thermal Hypotheses by Zuji Qiang

•Gas-Thermal Hypothesis

Rocks under stress terrestrial degassing emission of CH_4,CO_2 and charged particles solar radiation, electric field excitation thermal infrared temperature increase.

- Experimental results

Experimental Results under the Condition of External Loading Electric Field

Experimental results under the condition of external loading electric field

Temperature measurements of the air, CO_2, CH_4, H_e and the mixed gas of CO_2 and CH_4 with a given concentration are performed in the external loading of 4000 volt electrostatic field. The results are listed in Table 1.

Table 1 Temperature change of gases under the action of external transient electric field

No.	Experimental gas	Temperature before loading electric field	Temperature after loading electric field		Temperature change
			Constant electric field	Transient electric field	
1	gas with 8.15% of CO_2	28.2℃	28.2℃	32.0℃	3.8℃
2	gas with 8.15% of CO_2 and 11.4% of CH_4	28.9℃	28.9℃	35.0℃	6.1℃
3	gas with 3.8% of CH_4	28.8℃	28.8℃	34.0℃	5.2℃
4	gas with 1.52% of CH_4	28.5℃	28.5℃	32.0℃	3.5℃
5	normal air	28.8℃	28.8℃	31.4℃	2.6℃
6	gas with 5.3% of He	26.2℃	26.2℃	26.8℃	0.6℃

It can be seen from Table 1 that the temperature of each kind of gas all goes up, and the normal air temperature also goes high under the action of transient electric field, but the increasing temperature of He is only 0.6℃. The temperature increasing range becomes larger with the increasing of content of CH_4 and CO_2 in the air. But the temperature of each gas does not go up in the loading direct current field and no transient action of electric field.

The Curve of Gas Release Photon

According to Table 1 of experiment one and Fig. 1 of photon radiation surveyed by the photomultiplier in experiment two, gases can cause photon radiation and temperature increase under the effect of instantaneous electric field. Photon radiation is not continuous but pulsating, as illustrated in Fig. 1. No photon is released when the electric field rises, but during the fall of the electric field, it produces photon radiation. In addition, we observed that the number of photon radiated was fluctuating during the sudden fall of electric field. This means that the CO_2 gas may gain enough energy or not during this period. This phenomenon is similar to that observed by the satellite through the infrared temperature measurement before an earthquake.

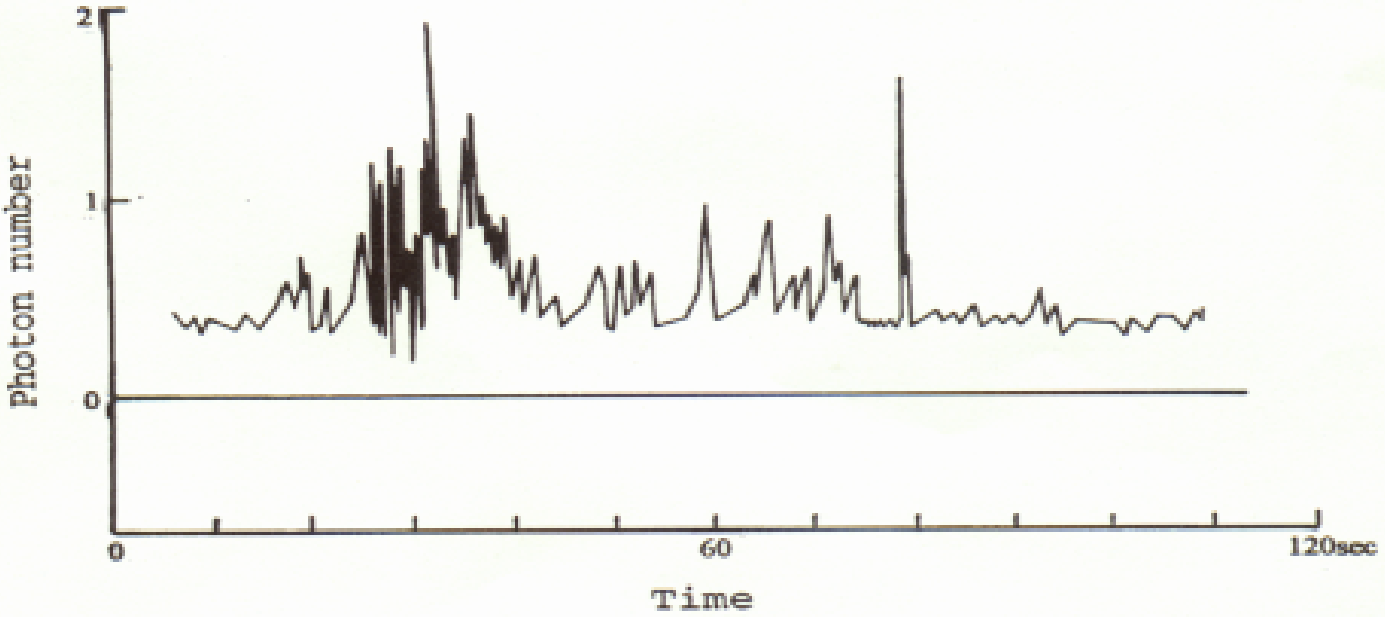


Fig. 1. The curve of gas release photon.

Natural Radioactivity, Earthquakes and the Ionosphere by Sergey Alexander Pulinets, University of Mexico.

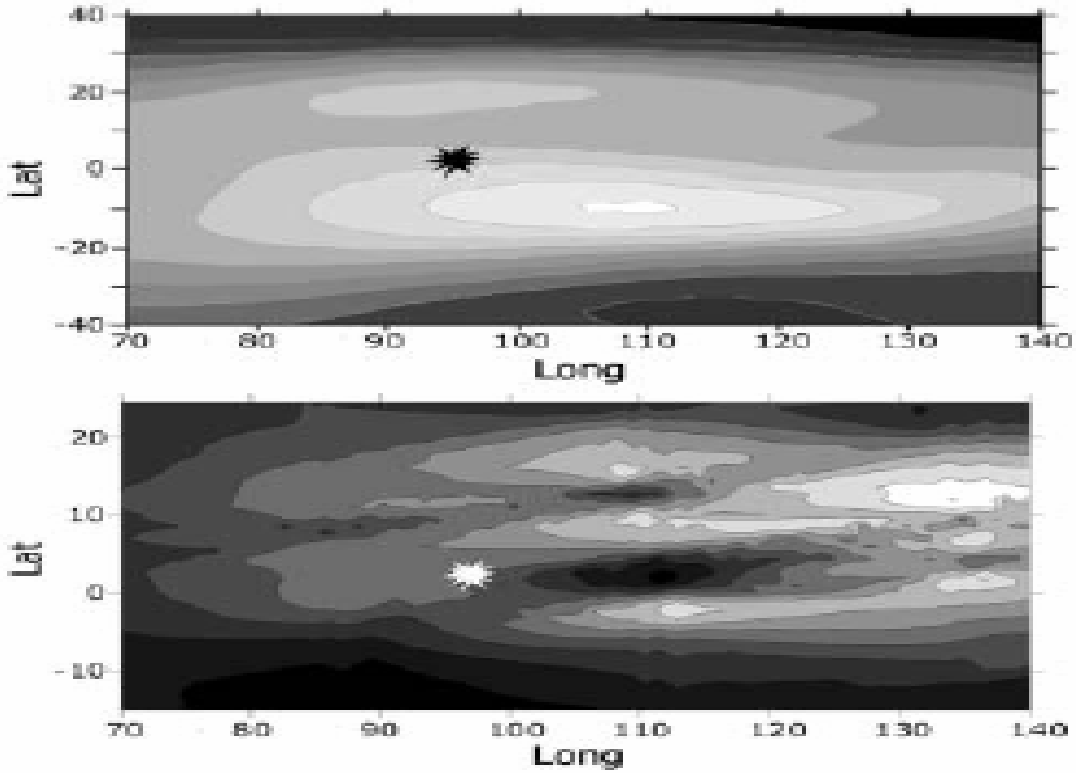


Fig. 1. (top) IONEX total electron content (TEC)—a special code that generates global maps of the vertical TEC using data from 150 GPS receivers distributed globally—as measured 2 days before the Sumatra earthquake of 26 December 2004 (modified after Zakharenkova et al. *[2006]). (bottom) In situ ion density distribution measured onboard the DEMETER satellite 6 days before the Sumatra earthquake of 28 March 2005. Lower plasma concentration is indicated by darker shading. Bursts indicate the position of the epicenter of the impending earthquake.*

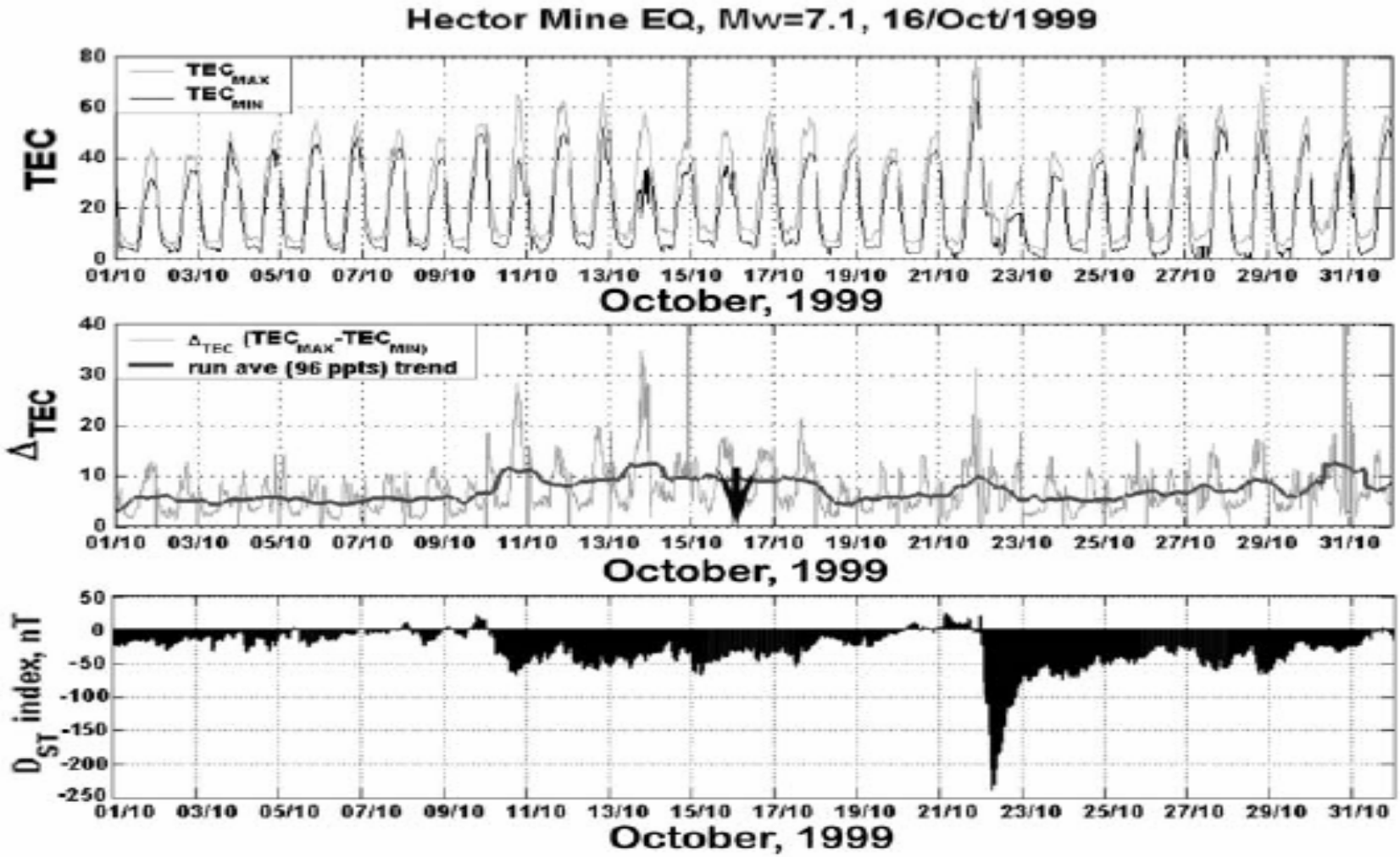


*Fig. 2. Analysis of GPS TEC data for a network of GPS receivers in California for the period of October of 1999. (top) The grey curve indicates maximal TEC values for the set of stations under analysis. The solid curve indicates minimum TEC values for the set of stations under analysis. (middle) The thin grey curve is the variability index, the difference between the maximum and minimum values presented in the top panel. The solid curve is the running (96 points) average. Arrow indicates the moment of seismic shock. (bottom) Global equatorial index of geomagnetic activity (*Dst *index) for October 1999. Note the increase of the variability index (middle panel) on 10 October, 6 days before the seismic shock. The index does not grow after strong geomagnetic storm (near -250 nanoteslas) on 22 October (*Dst *index, bottom panel).*

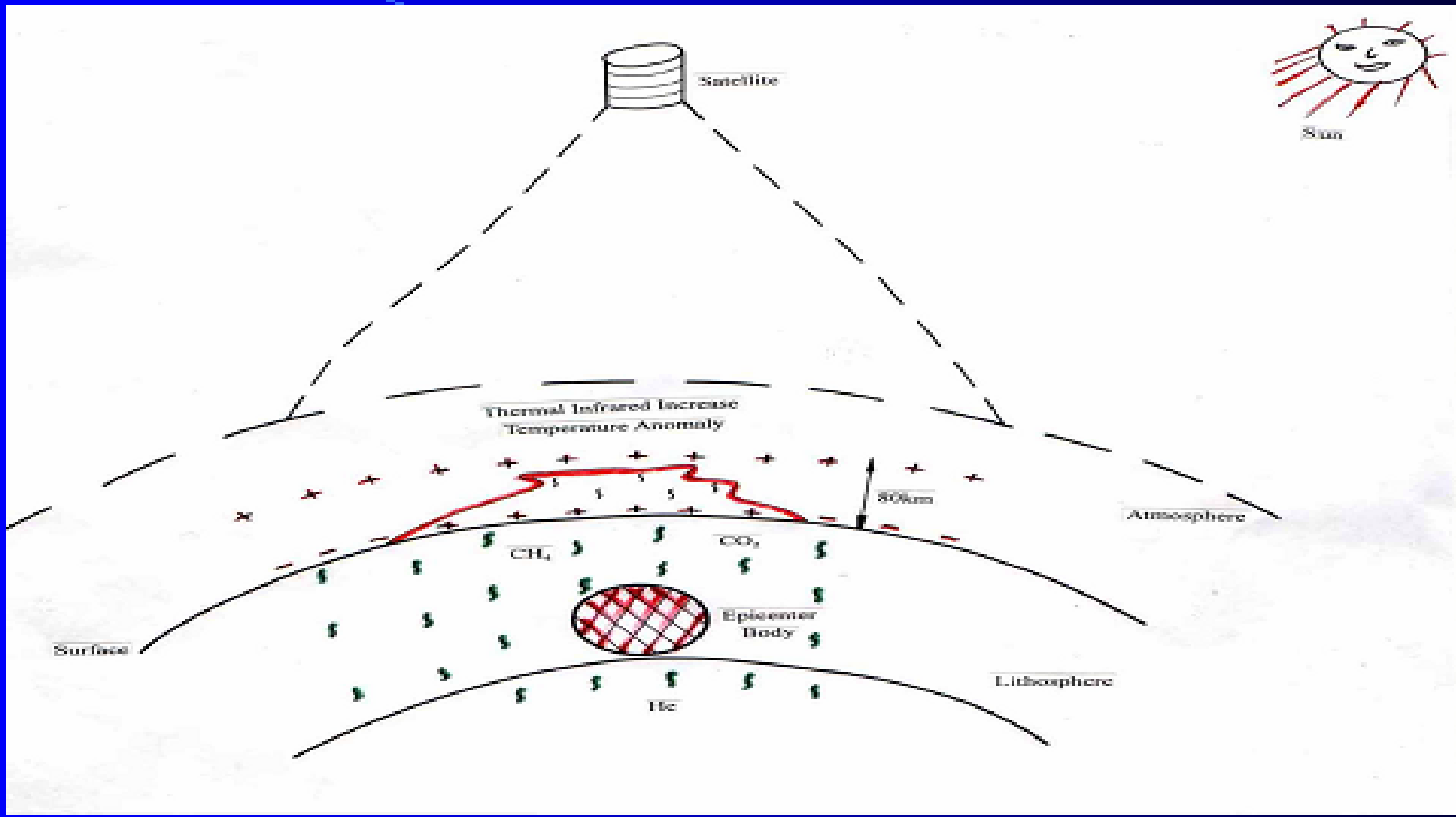


Fig. 3-1 Mechanism model of satellite thermal temperature increase

(3),The Positive Hole Carrier Hypotheses By F. Freund

a,b,c不同撞击速度

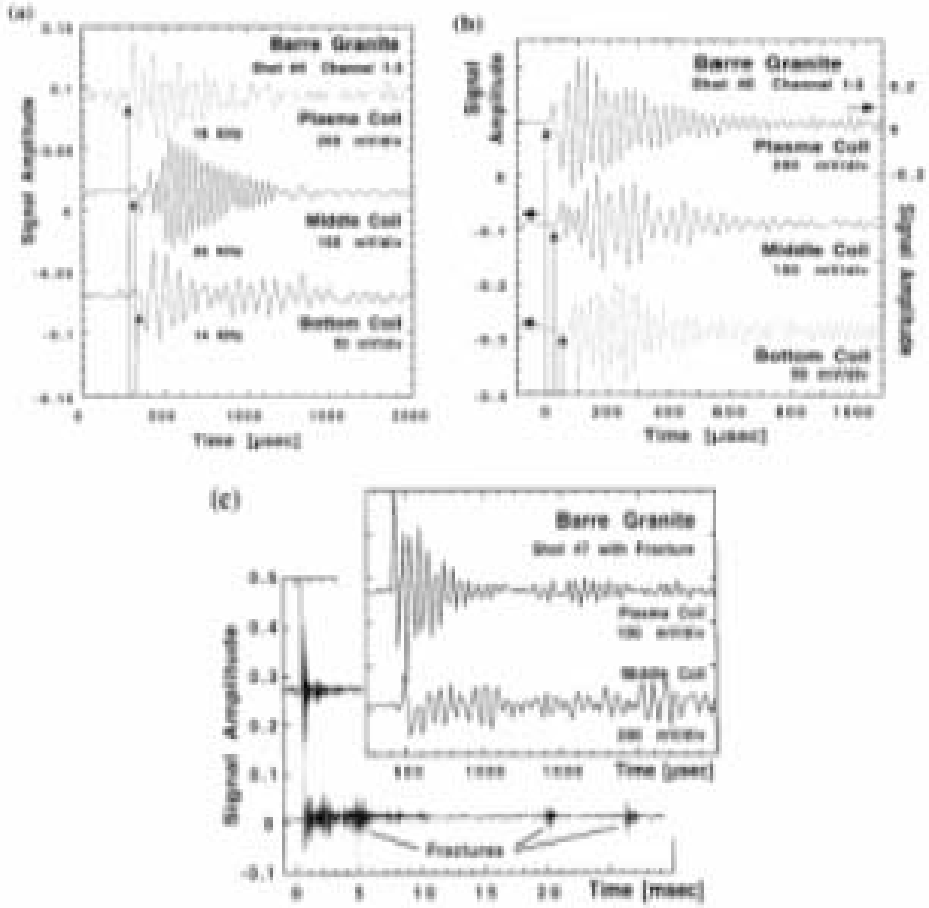


Fig. 7. Electromagnetic emission as recorded by the magnetic pick-up coils after impact of the Al sphere (a) during shot 4 at 1.46 km/s, (b) during shot 6 at 4.45 km/s and (c) during shot 7 at 5.64 km/s which led to disintegration of the granite block.

100米/秒撞击情况下 福伦得,F.

A,b,c示不同大小辉长岩岩芯,在不同电容器**mv装置,不同前置,后置,分别再加光磁辐射电流通过情况

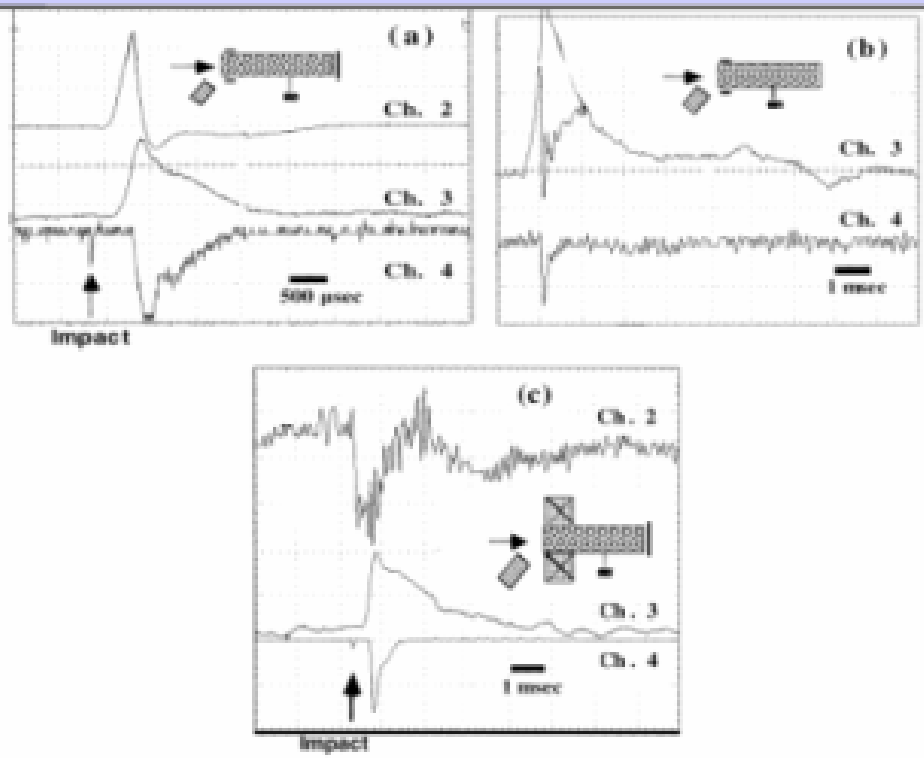


Fig. 1. 100 m/s impact. (a) Gabbro core, 1/8-in steel ball. Channel 2, front ring capacitor, 200 mV; channel 3, back end plate capacitor, 20 mV; channel 4, front end light emission, 200 mV. (b) Gabbro core; 3/16-in steel ball. Channel 1, ring collector voltage, 400 mV; channel 2, magnetic field emission, 10 mV; channel 3, back end capacitor voltage, 20 mV; channel 4, front end light emission, 500 mV; (c) Gabbro core; 3/16-in steel ball. Channel 1, ring collector voltage, 400 mV; channel 2, magnetic field emission, 10 mV; channel 3, back end capacitor voltage, 20 mV; channel 4, front end light emission, 500 mV.

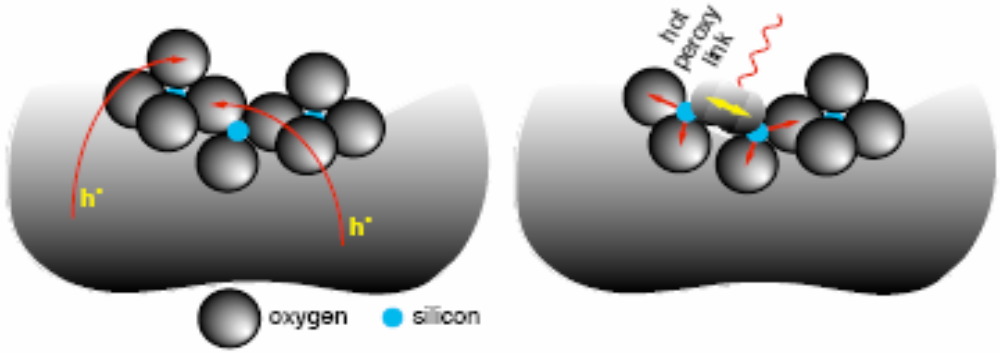


Fig. 5. Schematic representation of a mineral surface to illustrate the processes that may take place when p-holes (h) arrive at the surface (left). When the two p-holes recombine, recombination energy is released, leading to a vibrationally highly excited O-O bond, which can de-excite radiatively by emitting IR photons characteristic of transitions the energy levels of the O–O bond, and non-radiatively by channeling energy into neighboring bonds (right).

Of particular interest to the IR emission is the fact that it costs energy to break a peroxy bond. This energy is expended in the stressed rock volume in the form of mechanical work dispensed during plastic deformation. If the p-holes recombine at the surface to restitute peroxy bonds, some of this energy will be regained. However, this recombination energy will be deposited into the newly formed O^--O^- bonds, causing them to be "born" in a vibrationally highly excited state.

光强与能量之比

光两极真空管输出V

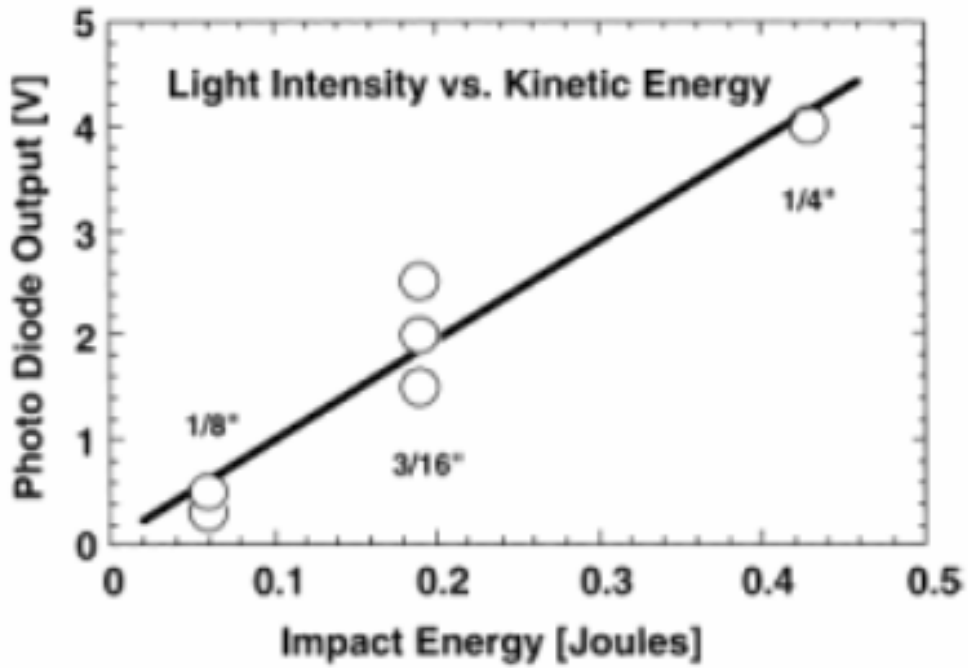


Fig. 4. Probable linear relation between the integrated intensity of the delayed light emitted from the rock cores and the kinetic energy of impact.

撞击能量(焦耳)

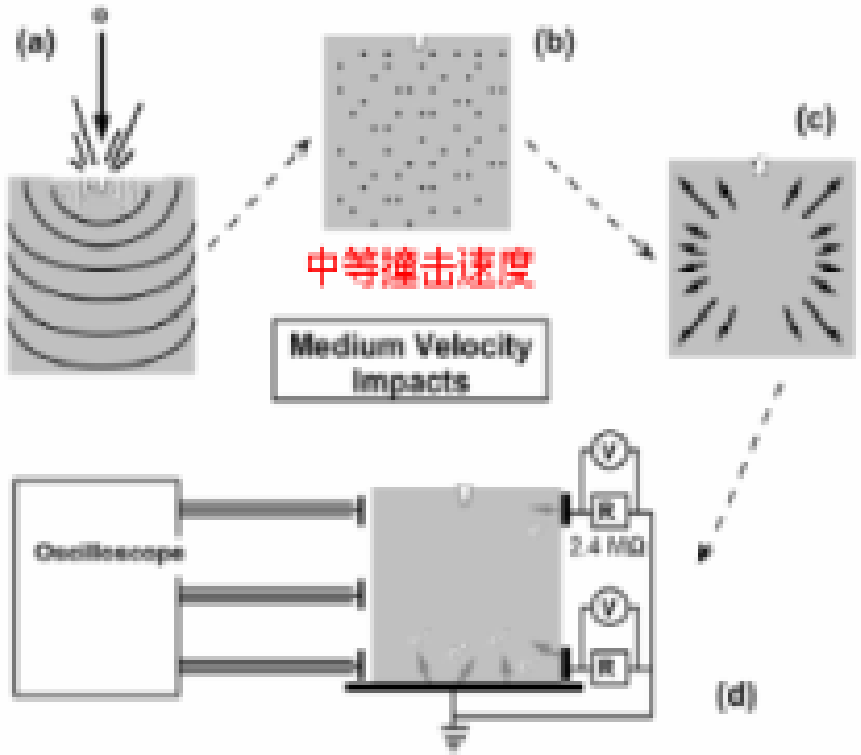
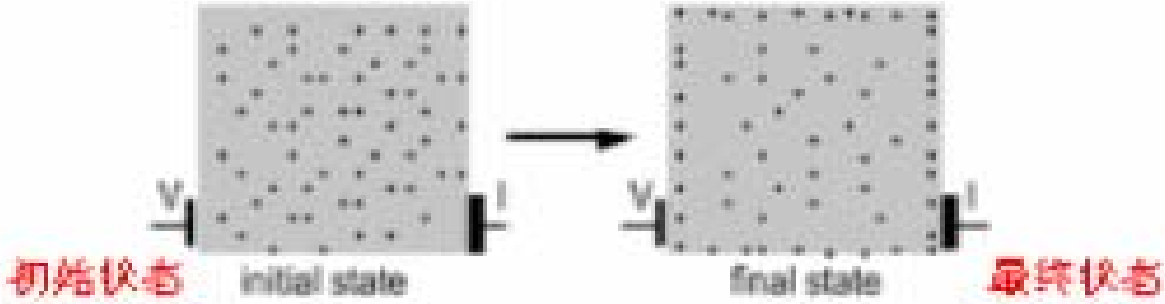
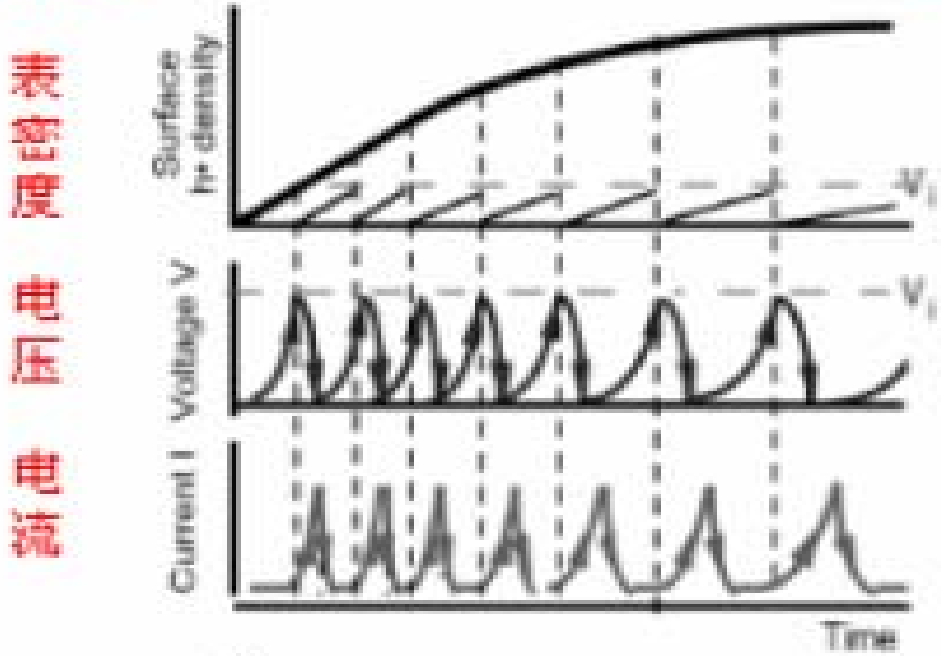
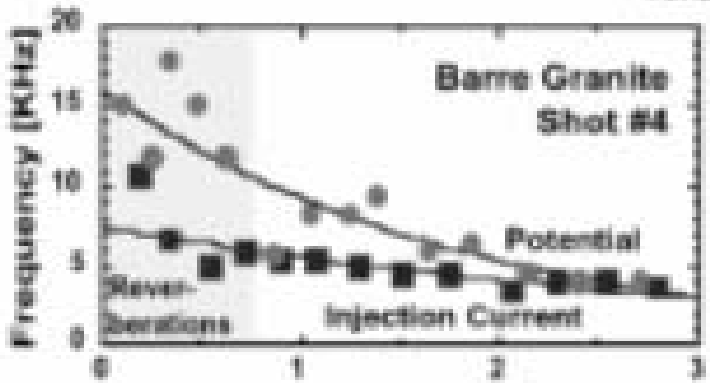


Fig. 10. Cartoon of the processes taking place in rapid succession in the granite block following a medium velocity impact. (a) Impact and propagation of the sound waves. (b) Rock volume filled with positive hole charge carriers activated in the wake of the sound waves. (c) Diffusion of positive holes to the surface due to mutual repulsion in the bulk. (d) Injection of electrons from the base plate and contact electrodes leading to oscillations.


初始状态
initial state
final state
最终状态


表面密度
电压
电流
Surface h+ density
Voltage V
Current I
Time


频率
Frequency [KHz]
Barre Granite
Shot #4
Potential
Injection Current
Reverberations

The Birth of a New Method on Earthquake prediction

- The anomalous temperature increase before an earthquake has been recorded in China long ago.Outgassing of the earth before earthquake was recorded A.C.2000a in China at Zhou Yi.

Practice is the only criteria to examine a truth.

- I am confident that precursors can be found before an earthquake and that earthquake prediction IS possible.

Best Practice

The Several Examples:

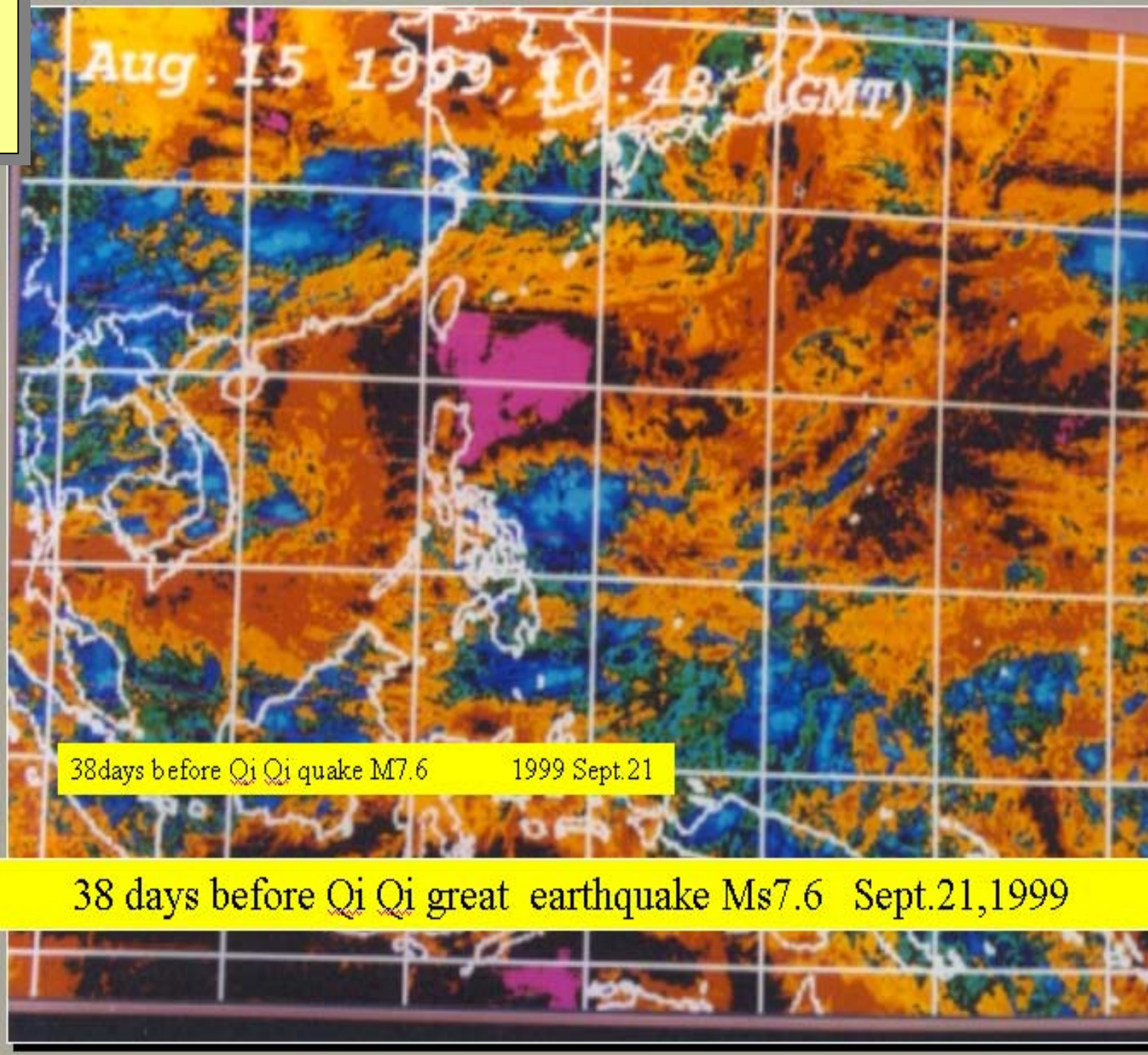
- QiQi EarthquakeM7.6
- Lijiang EarthquakeM7.0
- Gonghe EarthquakeM7.0
- Tainan EarthquakeM6.0
- Hualian EarthquakeM6.8
- Changshou EarthquakeM5.1
- JiashiEarthquakeM6.6
- Tangshan EarthquakeM4.7
- ShaheEarthquakeM4.0

Earthquake precursors should enable a predicator to give the three elements of a future earthquake: (place, magnitude and time) (Max Wyss, 1993, former chairperson of Earthquake Prediction Committee, IASPEI .

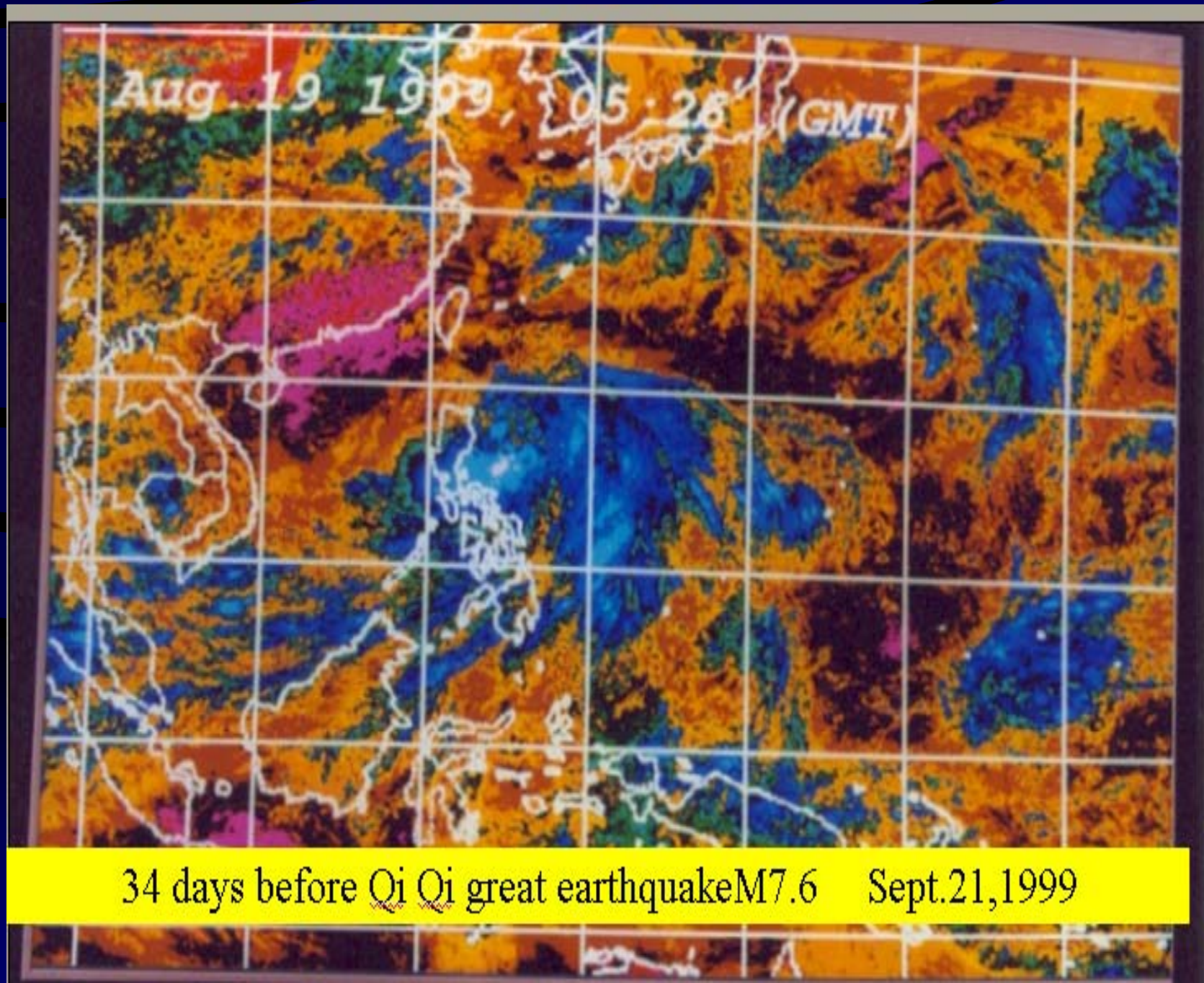
Qi Qi great earthquake M7.6 M7.1,Taiwan

- Sept.21,1999,23.7°N,121.1°E
- Predicted time:Sept.12-Oct.2,1999
- Area:24-25°N,121-122°E
- Magnitude:6.5±
- NO.73

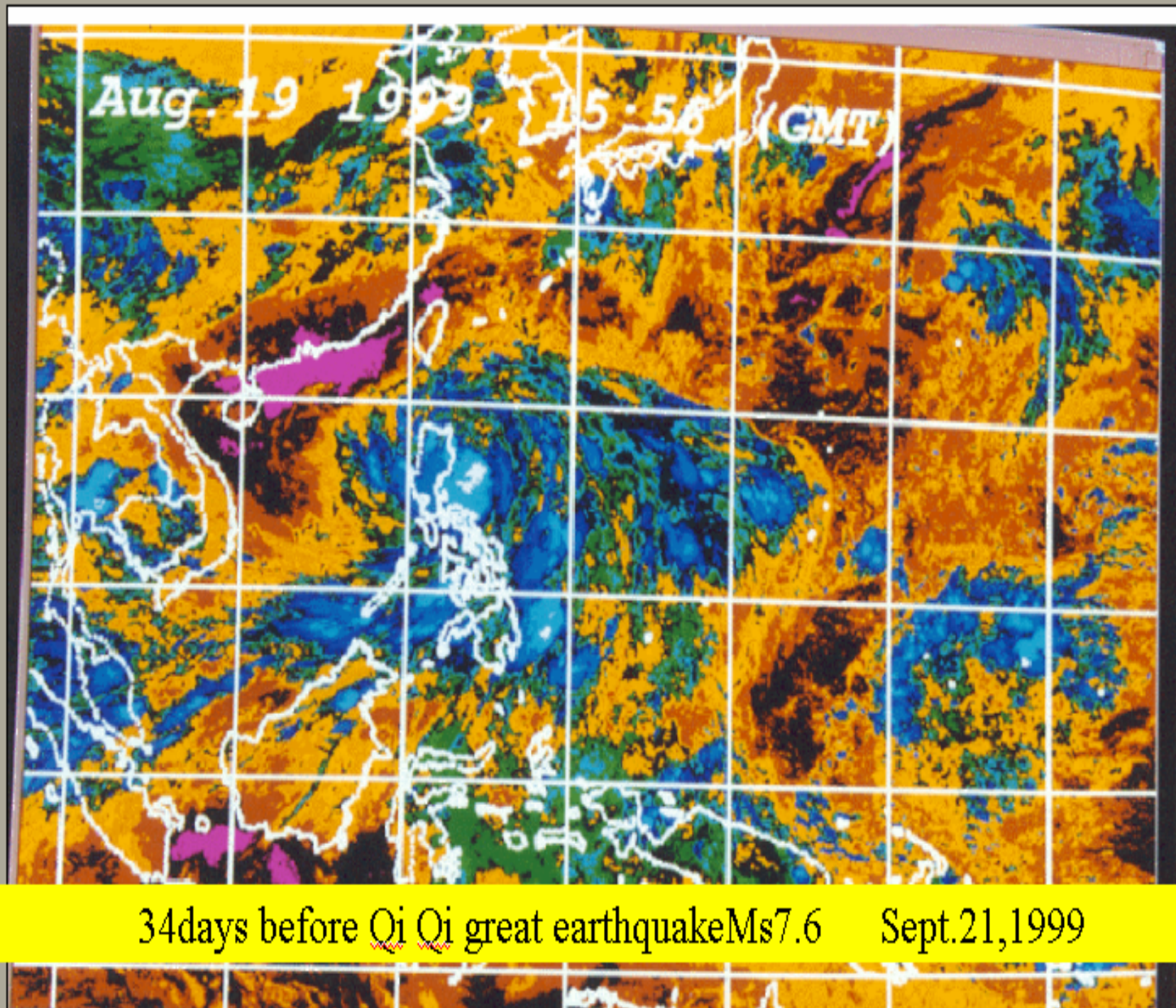
QZJ: QiQi Earthquake



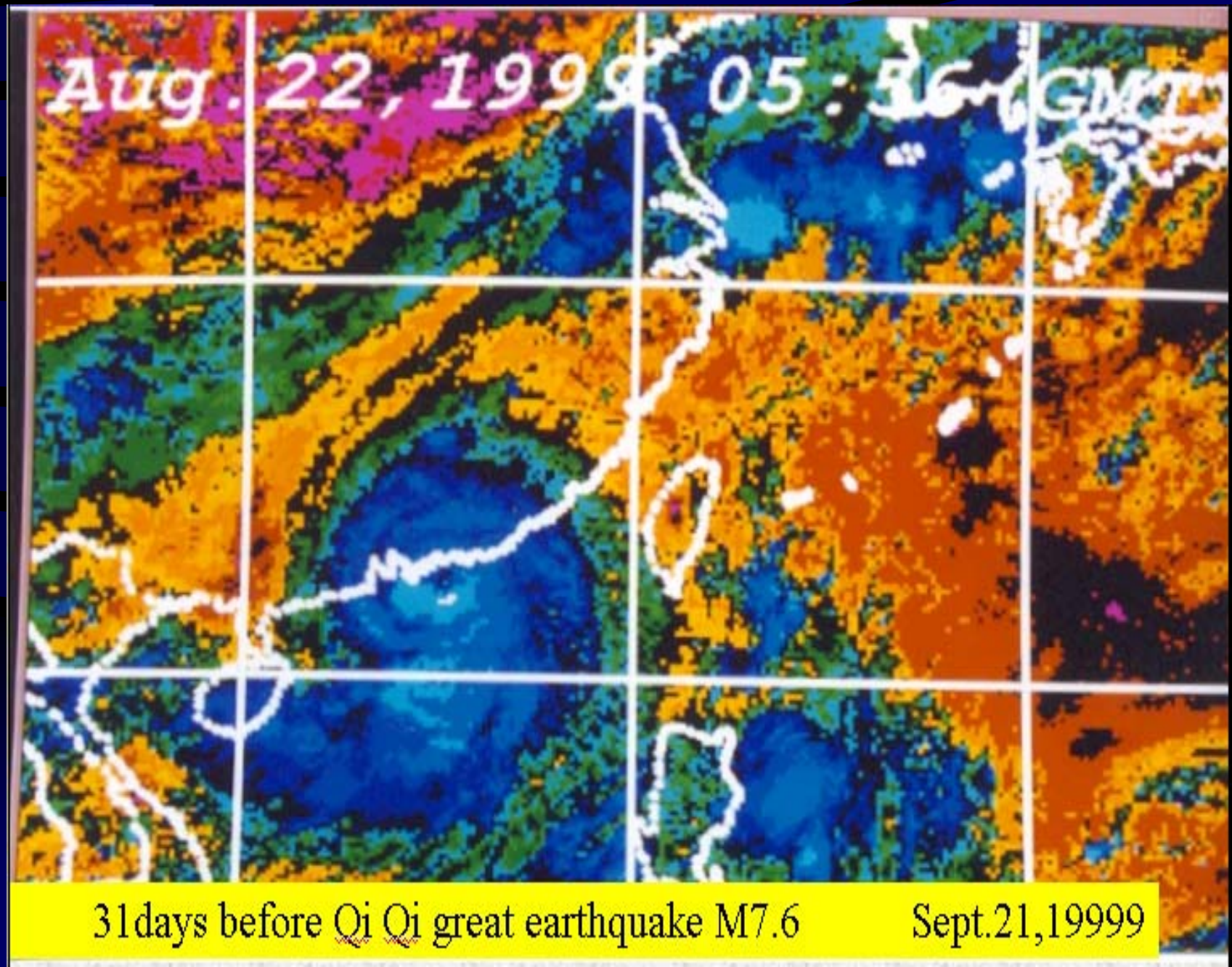
38 days before Qi Qi great earthquake Ms7.6 Sept.21,1999



34 days before Qi Qi great earthquakeM7.6 Sept.21,1999



34days before Qi Qi great earthquakeMs7.6 Sept.21,1999



31days before Qi Qi great earthquake M7.6 Sept.21,19999

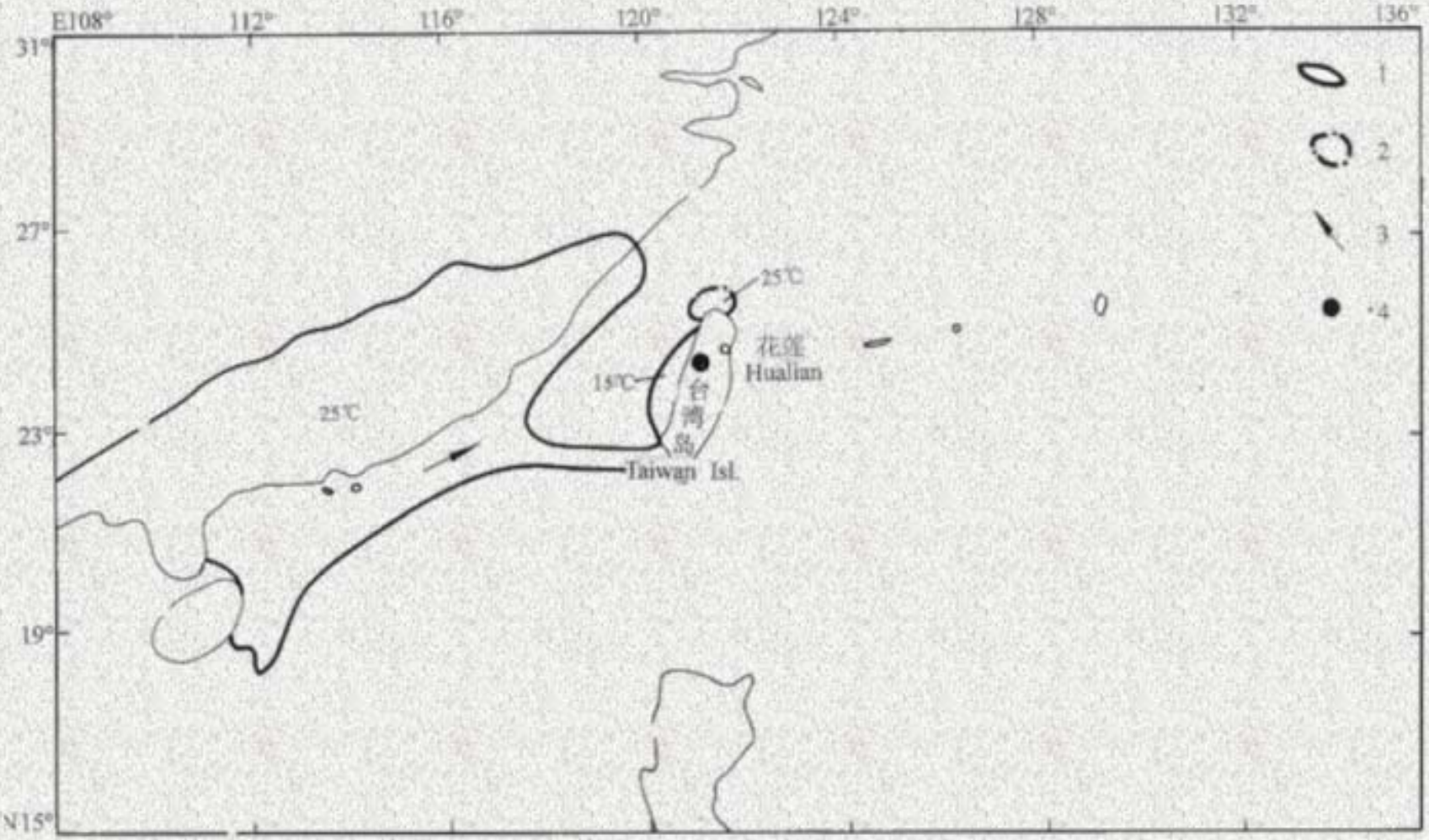


图 卫星热红外温度分布

Fig. The Satellite Thermal Infrared Temperature Distribution .

1. 1999 年 8 月 19 日 05:55(世界时)热异常边界 boundary thermal anomaly on Aug. 19, 1999 at 05:55(GMT); 2. 1999 年 8 月 19 日 15:55(世界时)热异常边界 boundary thermal anomaly on Aug. 19, 1996 at 15:55(GMT); 3. 1999年9月21日台湾Ms7.6级大地震震中(N23.7°, E120.9°), epicenter of great Taiwan Ms7.6 earthquake at N23.7°, E120.9°.

QZJ:QiQi Strong EartquakeM7.6

QiQi Taiwan

Predicted Card

短临预报卡片

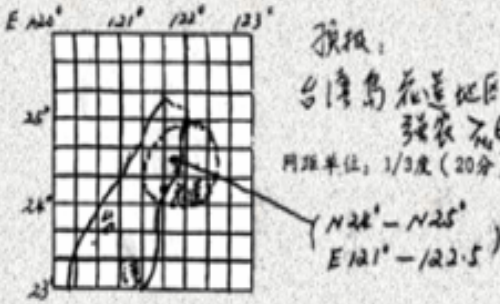
预报实现所属级别：○一级 ●二级 ○三级

预报内容：

1，时间：99年9月12日至99年10月12日

2，震级（Ms）：___级实际6.0级

3，地域：用封闭图形绘于下面经纬网内，并标注其图形拐点的经、纬坐标。



预报：台湾岛花莲地区将发生6.0

网格单位：1/3度（20分）

上述预报内容的依据和方法：

（文字简明，图件清晰，提供定量公式，可填写在背面或附页）

根据日月重叠红外线增温异常特征

（无感前兆）

预报的单位或集体签章：

个人的预报签字：

所在单位签章：

填报时间：1999年9月12日

通讯地址：

邮政编码：

等级标准	一级		二级		三级	
	时间	地域（最大直距）	时间	地域（最大直距）	时间	地域（最大直距）
≥7级	≤40天	≤300Km	≤60天	≤250Km	≤60天	≤250Km
6.5—6.9级	≤30天	≤150Km	≤40天	≤200Km	≤40天	≤200Km
6.0—6.4级	≤15天	≤120Km	≤20天	≤150Km	≤20天	≤150Km
5.5—5.9级	≤10天	≤100Km 仅适于东部地区或西部大城市附近	≤15天	≤120Km	≤15天	≤120Km
5.0—5.4级	无		≤10天	≤90Km 限首都圈地区	≤10天	≤90Km

3，单位或集体的预报应填全称，一式二份，一份寄所在省、自治区、市地震局（办）分析预报中心（室），另一份寄北京市166信箱第一研究室收，邮政编码100036。个人的预报应填所在单位全称和姓名及联系地址和邮政编码，只寄所在省、自治区、市地震局（办）分析预报中心（室）一份。

4，本卡片是专家评审的有效卡片，自制的、复印的均无效。

以下接收部门填写

收到卡片时间：　　收卡人签字：

初审意见：

9月12日报告北京地震局值班室

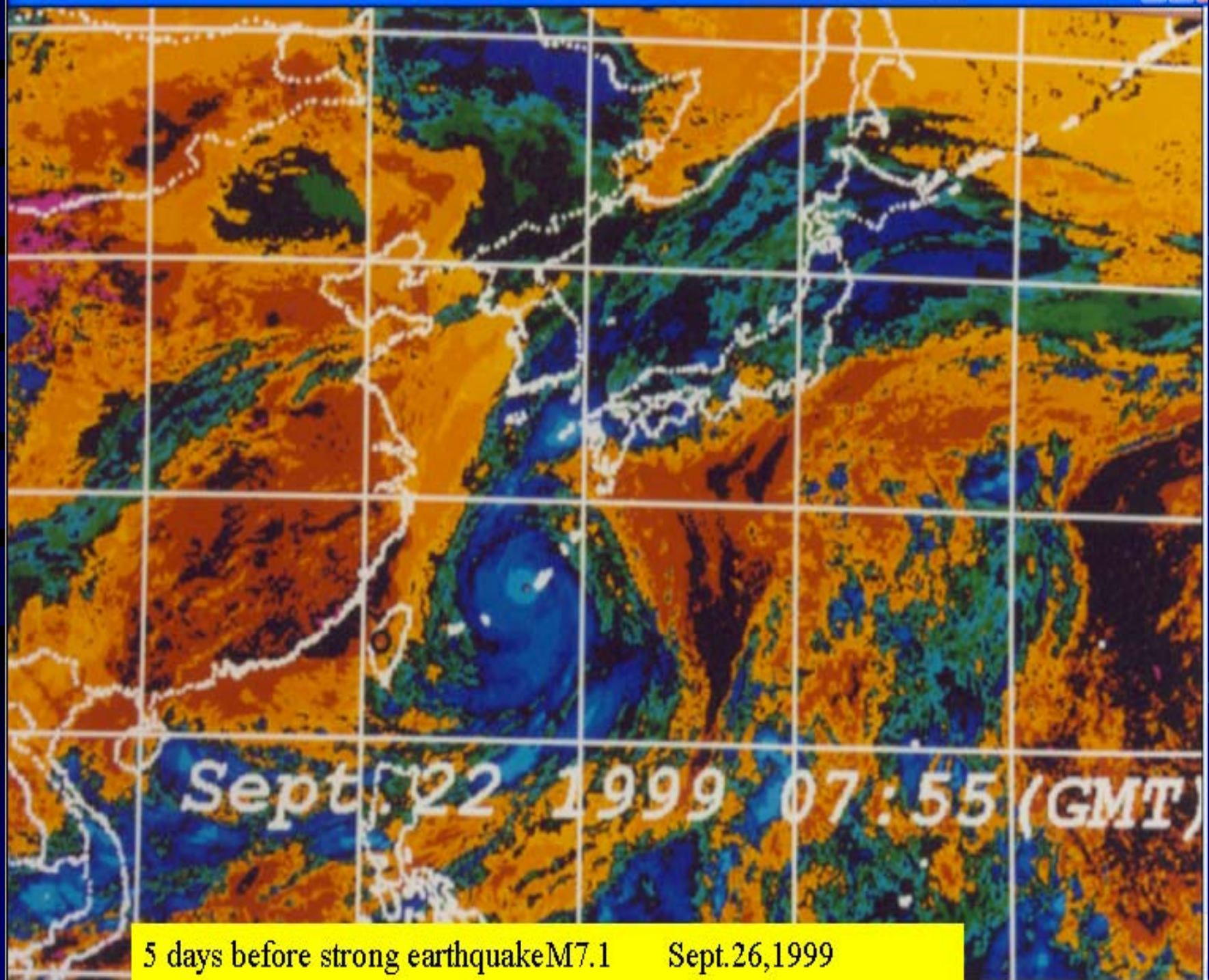
李元

初审人：　　年　月　日

Table 4 Check of the predicted earthquakes (1999-2000)

Predicted & In fact

1999	Location	Magnitude
1) Sept. 12-Oct. 12	N24-25 E121-122.5	>6.0
Sept.21	Chi-ChiN23.7, E121.1	7.6
		7.0
2) Sept.23- Oct.2	E120.5-121.5	7.0
	N23.5-24.5	
Sept. 26	Chi-Chi N23.9, E121.9	7.1
3) Oct.13-Nov.13	N23.5-24.5 E120.5-121.5	7.0
Oct.13 Jiayi	N23.9, E121.2	5.4
Oct.22 Jiayi	N23.6, E120.4	6.4
Oct.22	N23.6, E120.4	6.1
Nov. 2 Hualian	N23.5, E121.6	6.9



5 days before strong earthquakeM7.1 Sept.26,1999

Table 4 Check of the predicted earthquakes (1999-2000)

Predicted & In fact

1999	Location	Magnitude
1) Sept. 12-Oct. 12	N24-25 E121-122.5	>6.0
Sept.21	Chi-ChiN23.7, E121.1	7.6
		7.0
2) Sept.23- Oct.2	E120.5-121.5	7.0
	N23.5-24.5	
Sept. 26	Chi-Chi N23.9, E121.9	7.1
3) Oct.13-Nov.13	N23.5-24.5 E120.5-121.5	7.0
Oct.13 Jiayi	N23.9, E121.2	5.4
Oct.22 Jiayi	N23.6, E120.4	6.4
Oct.22	N23.6, E120.4	6.1
Nov. 2 Hualian	N23.5, E121.6	6.9

No.74

填卡须知

1. 预报实现所属级别的确认，只填符〇涂实为●

2. 预报内容，必须按照确认的级别所规定的等级标准填写；

预报标准	一 级		二 级		三 级	
	时 间	地域（最大震距）	时 间	地域（最大震距）	时 间	地域（最大震距）
≥7级	≤40天	≤300Km	≤40天	≤250Km	≤40天	≤250Km
6.5—6.9级	≤30天	≤150Km	≤40天	≤200Km	≤40天	≤200Km
6.0—6.4级	≤15天	≤120Km	≤20天	≤150Km	≤20天	≤150Km
5.5—5.9级	≤30天	≤100Km（仅适于京津地区或强震七级台附近）	≤15天	≤120Km	≤15天	≤120Km
5.0—5.4级	无		≤10天	≤90Km（短临部署地区）	≤10天	≤90Km

3. 单位或集体的预报应填全称，一式二份，一份寄所在省、自治区、市地震局（办）分析预报中心（室），另一份寄北京市166信箱第一研究室收，邮政编码100036。个人的预报应填所在单位全称和技术职务地址和邮政编码，只寄所在省、自治区、市地震局（办）分析预报中心（室）一份。

4. 本卡片是专家评审的有效卡片，自制的、复印的均无效。

以下接收部门填写

收到卡片时间：　　接卡人签字：

初审意见：

（用以当日异常预测意见的领取中心签章）

邮寄编号

初审人：　　年　月　日

短临预报卡片

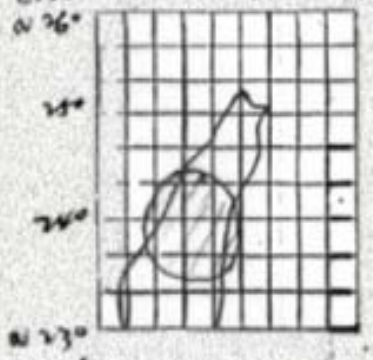
预报实现所属级别：〇一级　●二级　〇三级

预报内容：

1. 时间：99年9月23日至99年10月2日

2. 震级（Ms）：＿＿级至7.0级

3. 地域：用封闭图形绘于下面经纬网内，并标注该图形拐点的经纬坐标。



预报：
台湾岛特定区域
（南投）5.5级强震

网格单位：1/3度（20分）

N23.5°～N24.5°

E120.5°～E121.5°

上述预报内容的依据和方法：

（文字简明，图件清晰，提供定量公式，可填写在背面或附页）

根据日月星地球120°经线五系统综合

预报的单位或集体签章：

个人的预报签字：[illegible]　　所在单位签章：

填报时间：99年9月23日

通讯地址：　　邮政编码：

卫星热红外方法对近期台湾地震的短临预报证明

9月12日和23日我局先后收到强祖基教授对台湾地震的两次短临预报意见（见附件），预报采用了卫星热红外的预测方法。

地震实况表明，在第一个预报时段内，台湾花莲—南投地区已发生 $M_L \geq 6.0$ 级强震5次，最大为7.6级，在第二个时段已发生7.1级强震，预报三要素均正确，已取得良好预报效果，特此证明。

北京市地震局科技监测处

1999年10月10日

Certificate of Predication Accuracy issued by Beijing Municipal Bureau of Earthquake, which affirmed that my predictions of Taiwan QiQi Big Earthquake and subsequent aftershocks were correct.

填卡须知　　62614167

1. 预报实现所属级别的确认，只须将○涂实为●

2. 预报内容，必须按照确认的级别所规定的等级标准填写：

强级标准	一级		二级		三级	
	时间	地域（最大直距）	时间	地域（最大直距）	时间	地域（最大直距）
≥7级	≤40天	≤200Km	≤60天	≤250Km	≤60天	≤250Km
6.5—6.9级	≤30天	≤150Km	≤40天	≤200Km	≤40天	≤200Km
6.0—6.4级	≤15天	≤120Km	≤20天	≤150Km	≤20天	≤150Km
6.5—6.9级	≤30天	≤100Km	≤15天	≤120Km	≤15天	≤120Km
	保留于实际地区或国际大城市附近					
6.0—6.4级	无		≤10天	≤90Km	≤10天	≤90Km
			阻尼部附近地区			

3. 单位或集体的预报应填全称，一式二份，一份寄附在省、自治区、市地震局（办）分析预报中心（室），另一份寄北京市166信箱第一研究室收，邮政编码100036。个人的预报应填所在单位全称和社会观察地址和邮政编码，只寄附在省、自治区、市地震局（办）分析预报中心（室）一份。

4. 本卡片是专家评审的有效卡片，自制的、复印的均无效。

以下接收部门填写

收到卡片时间：　　收卡人签字

初审意见：　北京市地震局

高旭付局长收

初审人：　　年　月　日

短临预报卡片

预报实现所属级别：○一级　●二级　○三级

预报内容：

1. 时间：99 年 10 月 13 日至 99 年 11 月 13 日

2. 震级（Ms）：___级至 7.0 级

3. 地域：用封闭图形绘于下面经纬网内，并标注其图形拐点的经纬坐标。

预报：

台湾海峡震区南段

一带将发生强震

网距单位：1/3度（20分）

E120.5° ~ E121.5°

N23.5° ~ N24.5°

上述预报内容的依据和方法：

（文字简明，图件清晰，提供完整公式，可填写在背面或附页）

挑近日已是热红外增强异常特征

预报的单位或集体签章：

王早热红外氯积银

个人的预报签字：

强让菱

李伦芝

侯[illegible]

所在单位签章：

填报时间：99 年 10 月 15 日

通讯地址：

邮政编码：

北 京 市 地 震 局

卫星热红外方法预测地震
效果证明

十月十五日我局收到强祖基教授等人送交的 1 份短期预测意见，提出：1999 年 10 月 13 日至 11 月 13 日将在台湾南投一带发生 7.0 级地震。地震实况表明，这次地震预报基本正确，1999 年 10 月 22 日在台湾嘉义、南投间发生 6.4 级地震，发震时间和地点正确，震级略小。特此证明。

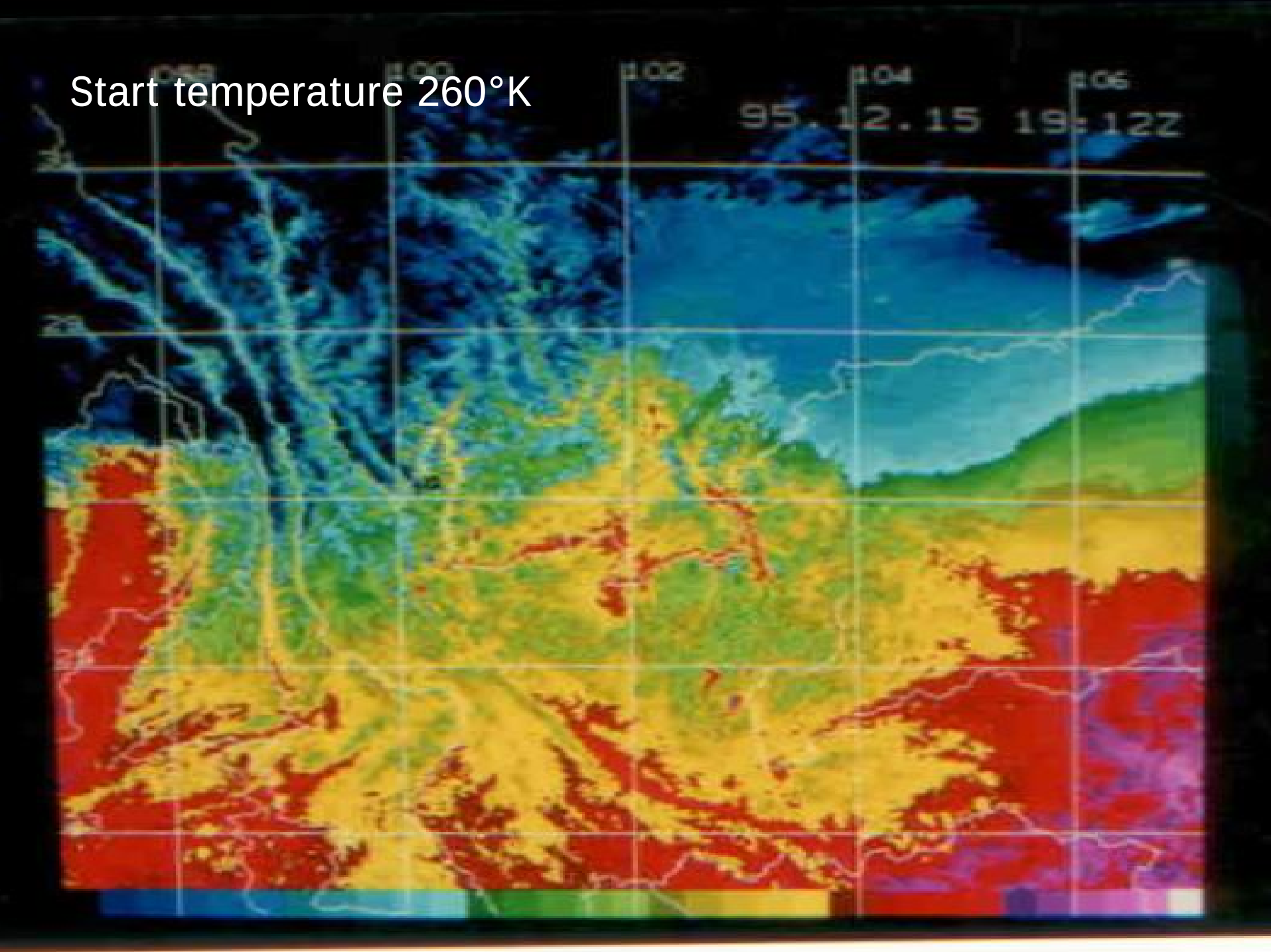
北京市地震局科技监测处

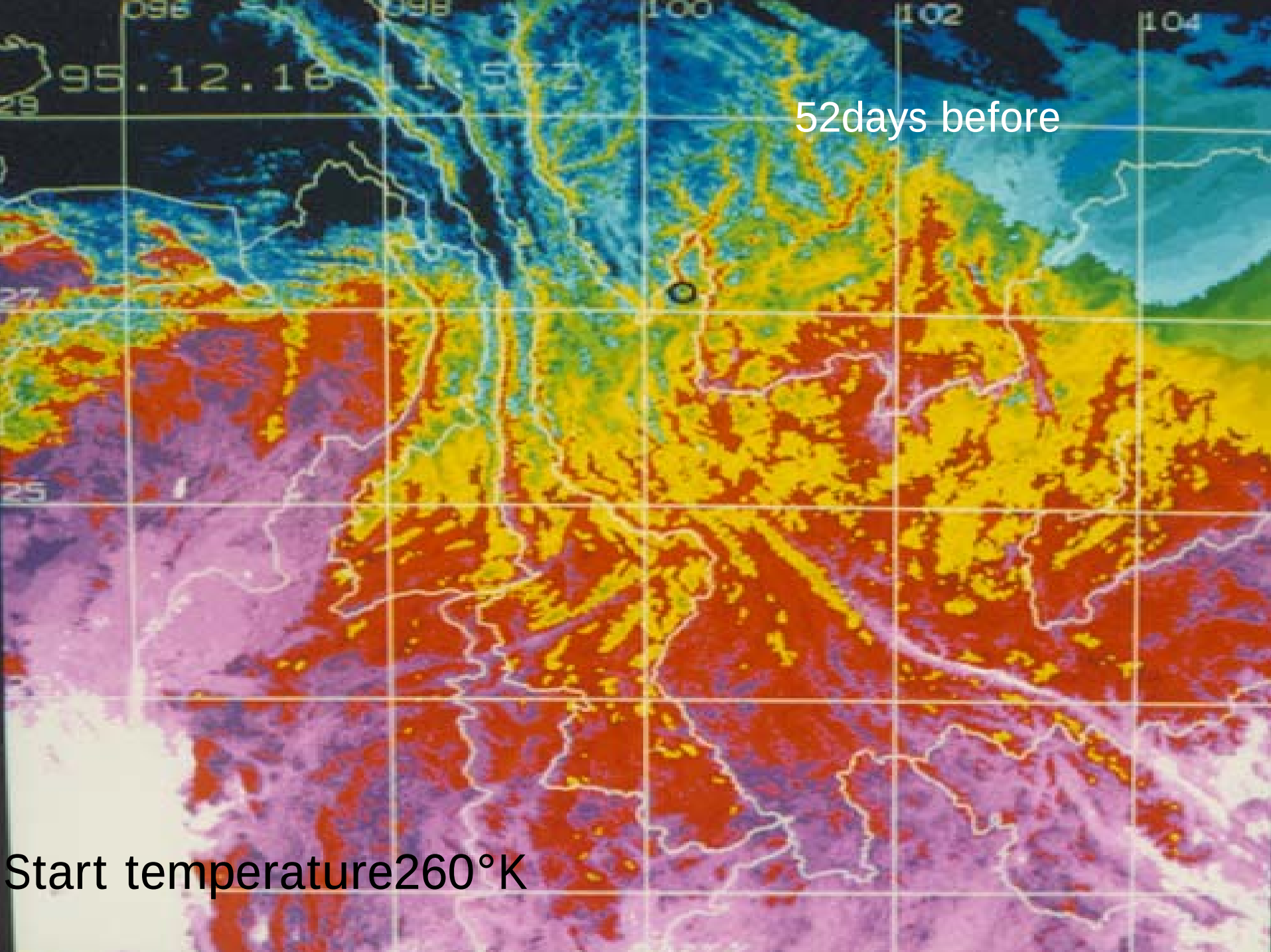
1999 年 11 月 8 日

Certificate of Predication Accuracy issued by Beijing Municipal Bureau of Earthquake, which affirmed that my predictions of Taiwan QiQi Big Earthquake and subsequent aftershocks were correct.

Lijiang EarthquakeM7.0

- February 3,1996　27.2°N,100.3°E
- Predicted time:Dec.16,1995-Jan.25 ,1996
- Area:25-27°N,101-103°E
- Magnitude:6.5-6.9
- No.32


Start temperature 260°K
95.12.15 19:12Z


96
98
100
102
104
95.12.16
29
27
25
52days before
Start temperature260°K

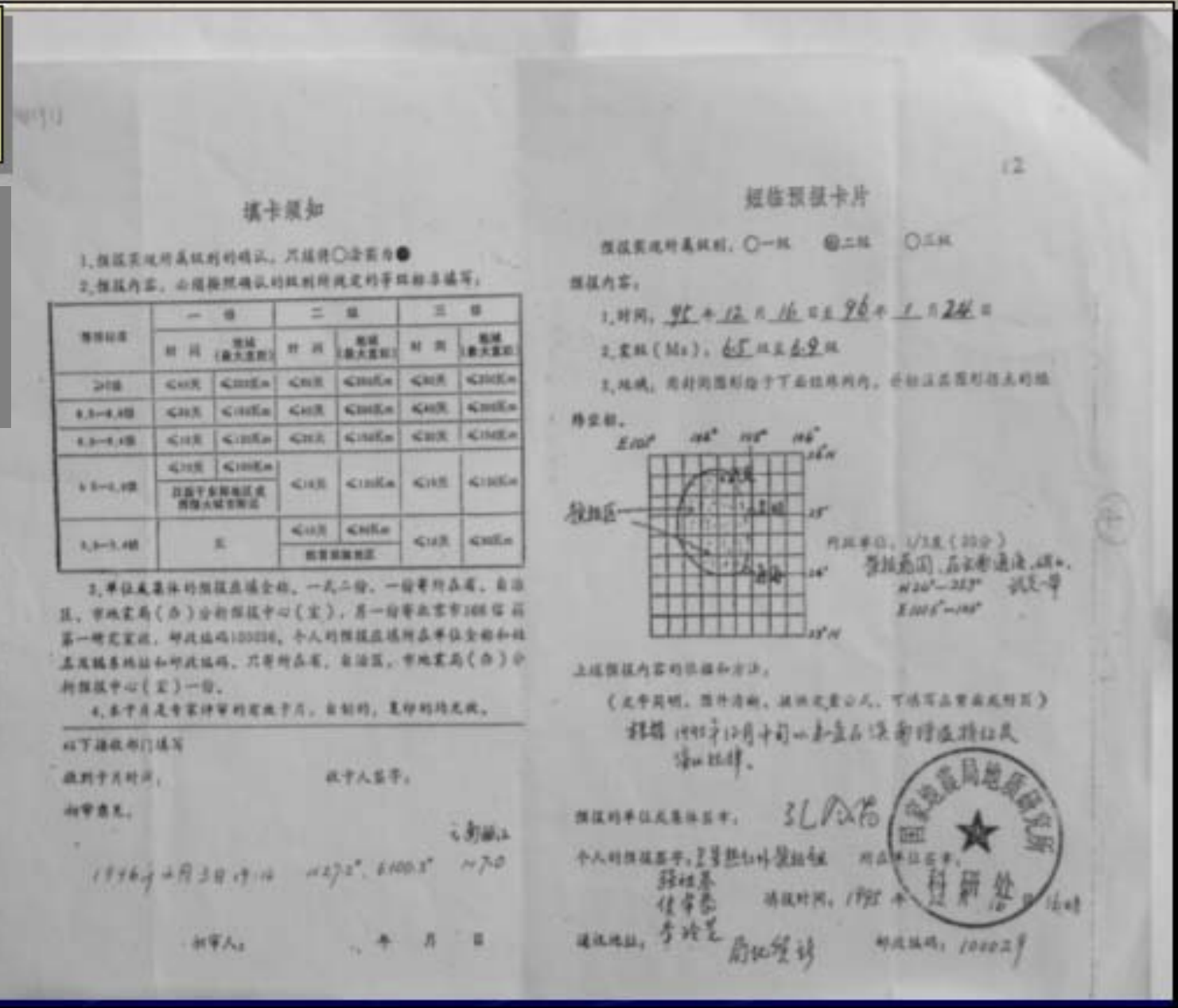
QZJ:03/02,1996

云南丽江M7.0

QZJ:

震中差120Km,

时间提前9天

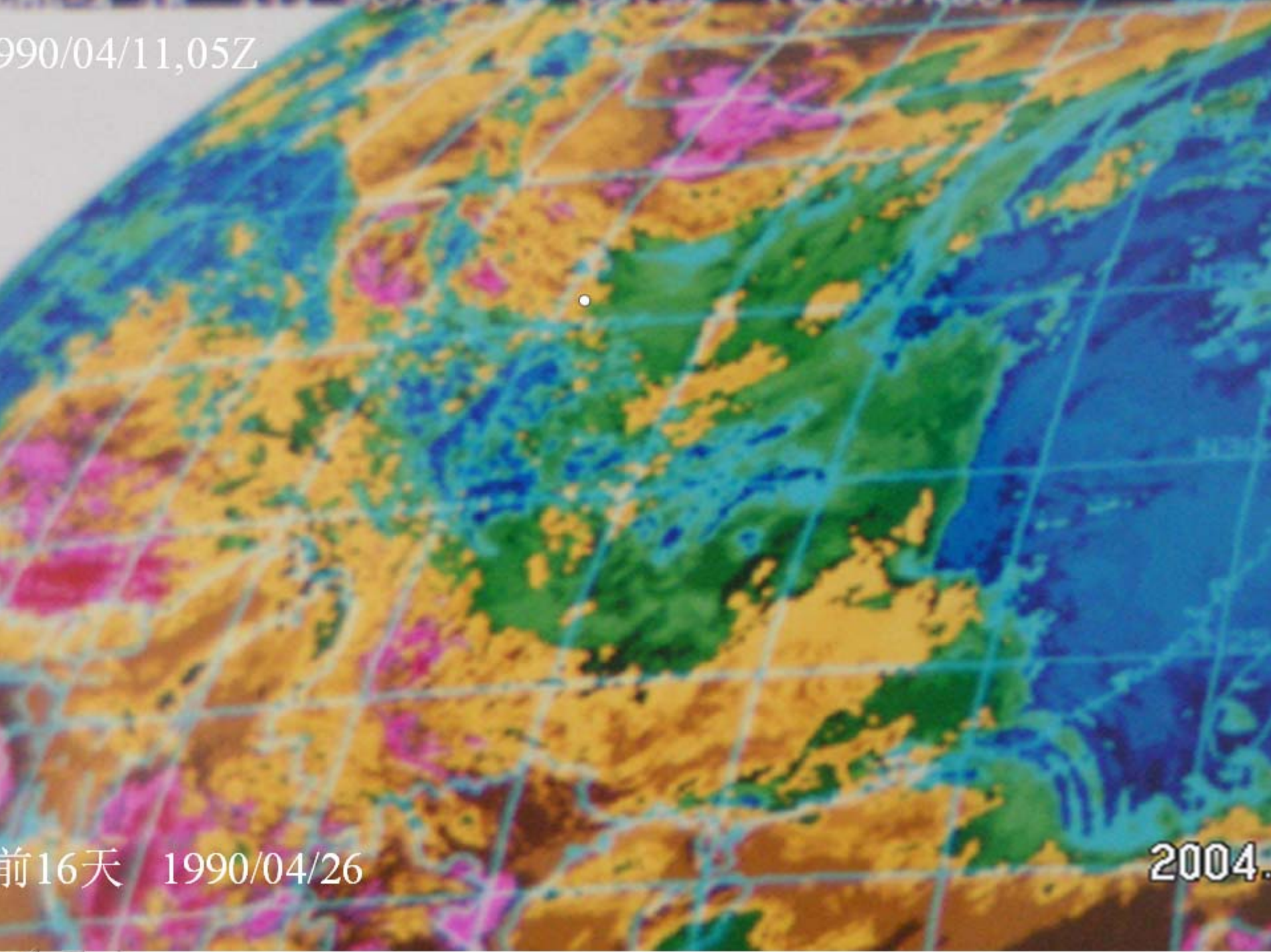


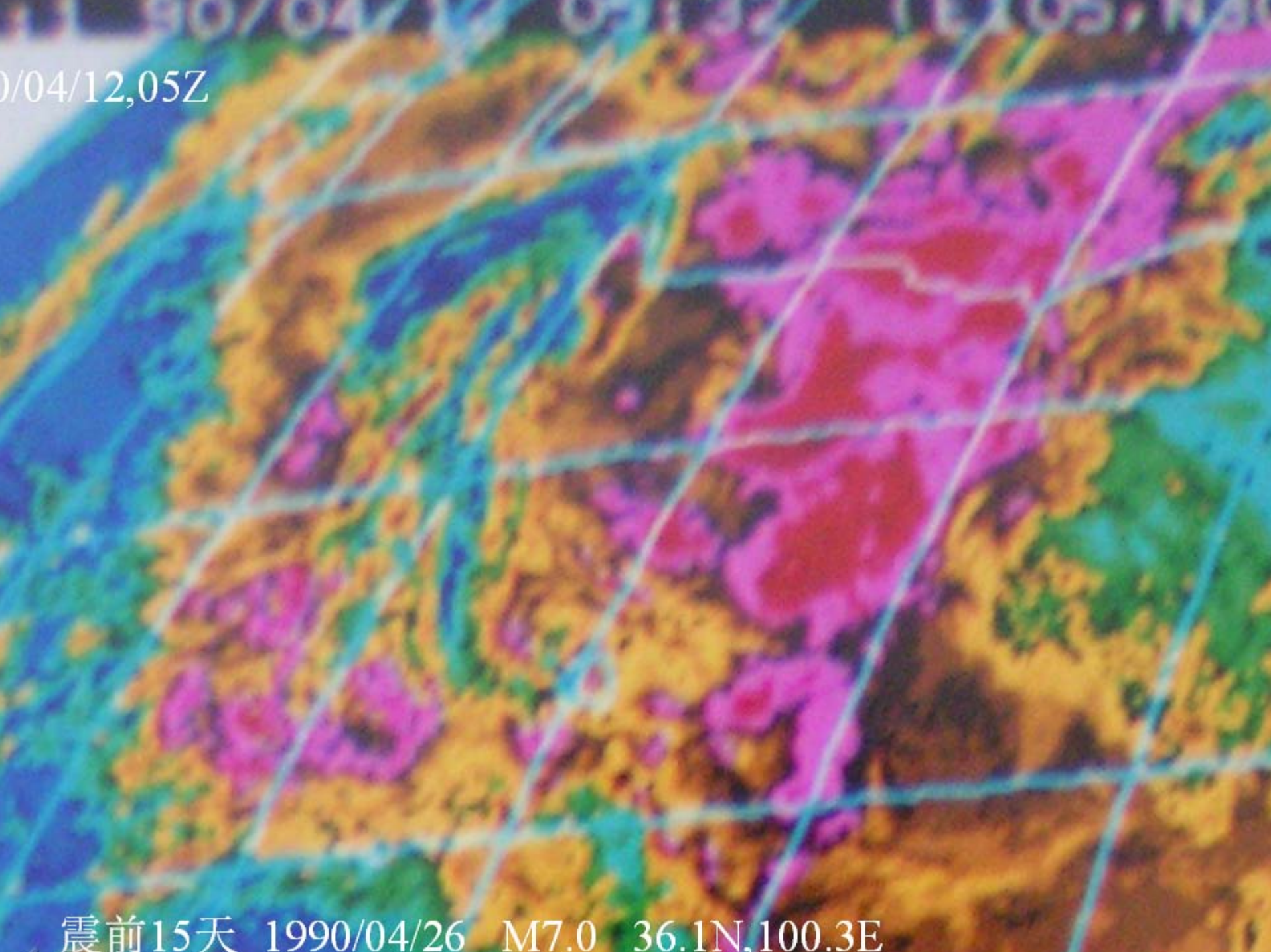
填卡须知

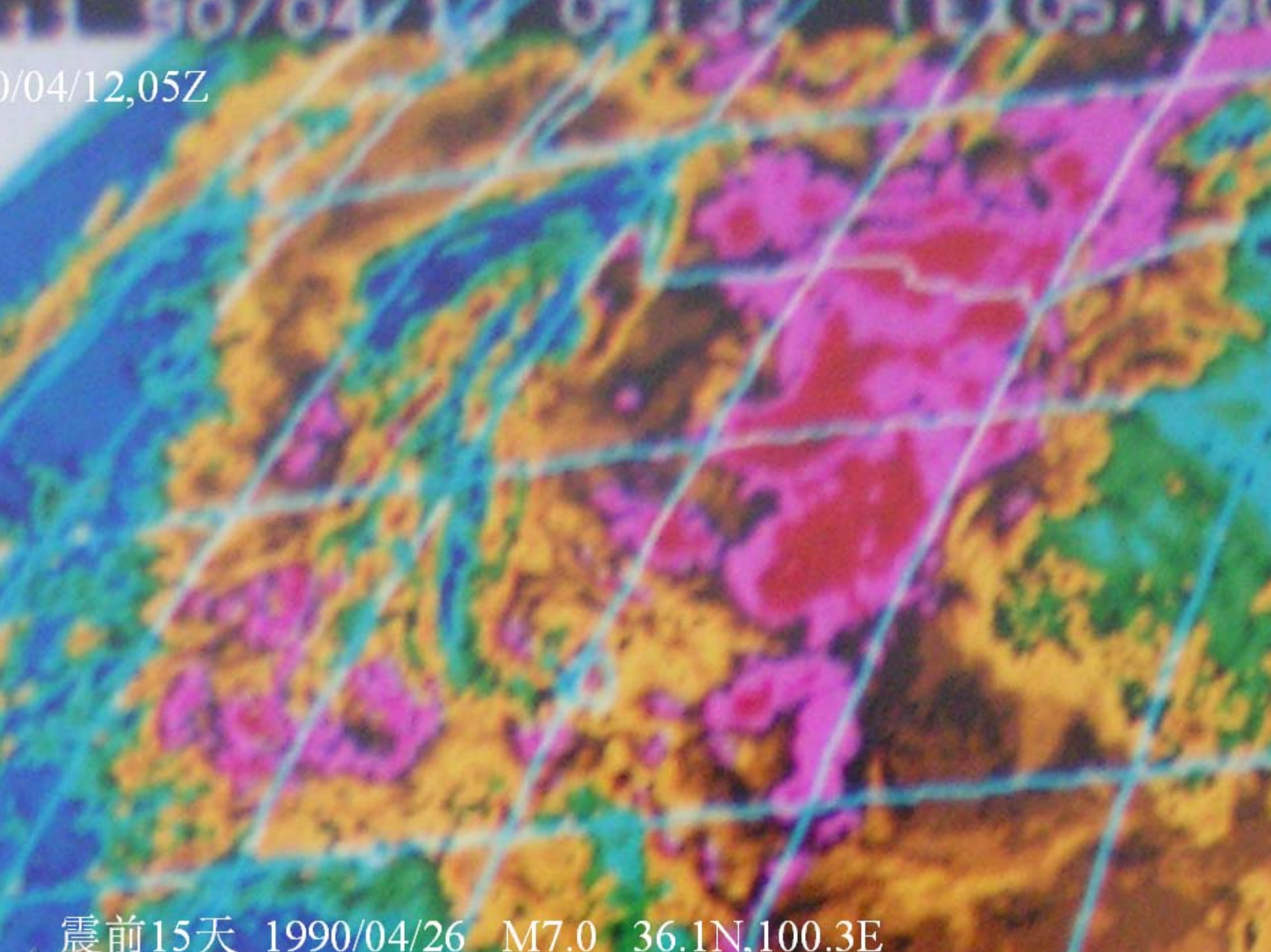
短临预报卡片

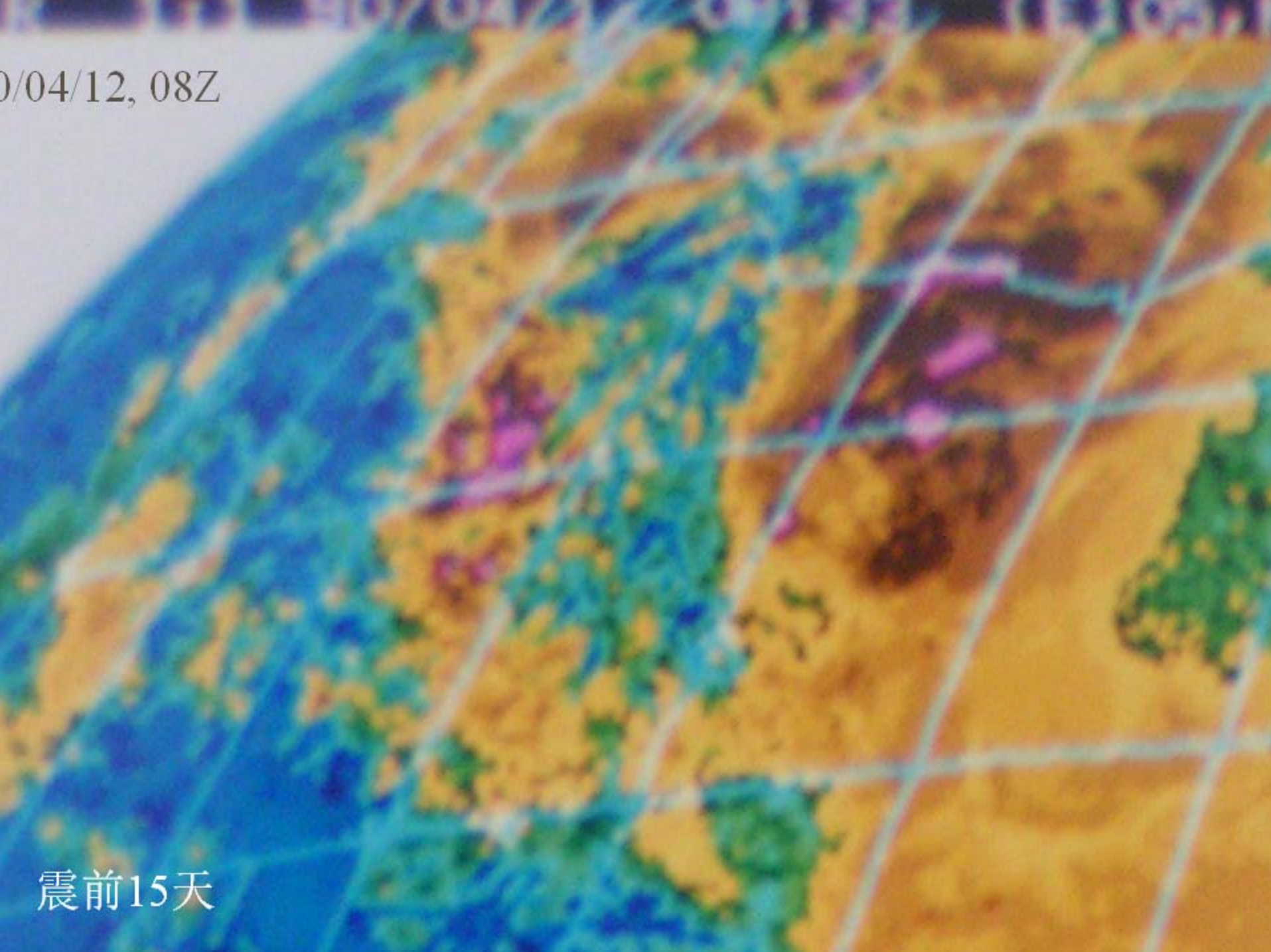
Gonghe Earthquake M7.0
Ganshu Province

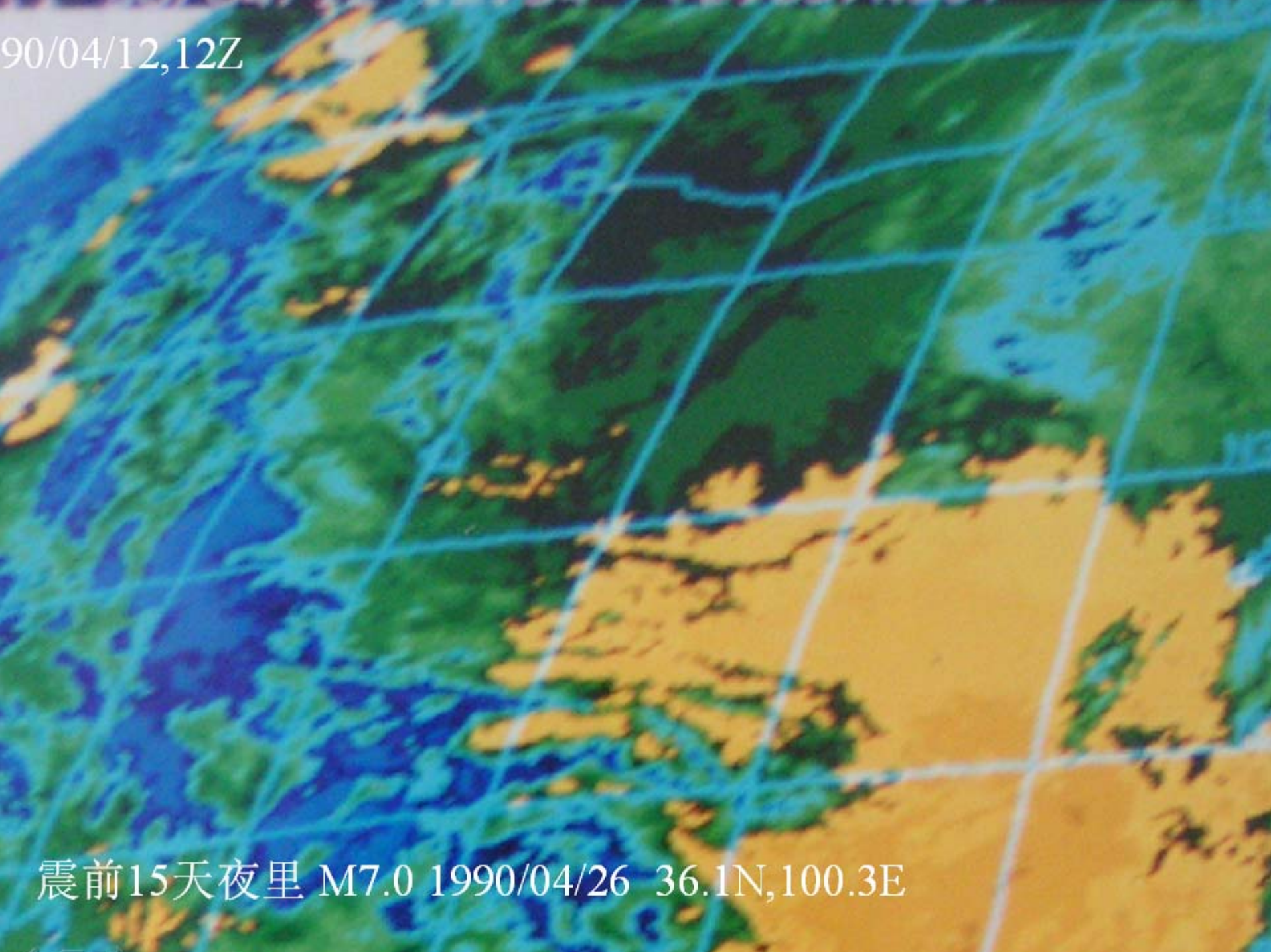
- April 26,1990　36.1°N,100.3°E
- Predicted time　April 17-25,10days before
- Magnitude:6.5-7.5
- Area:36-38°N,99-101°E
- No.2

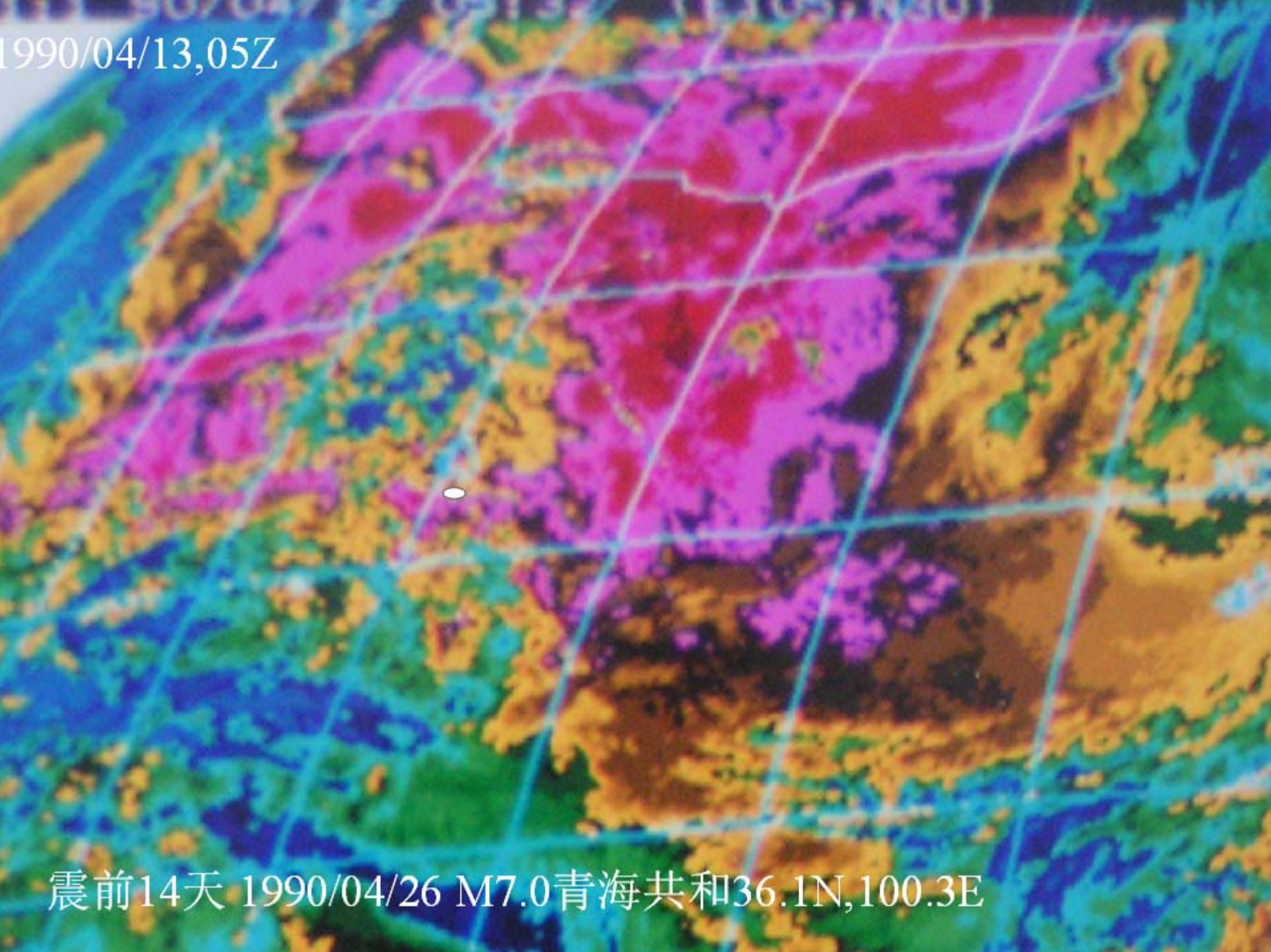

990/04/11,05Z
前16天 1990/04/26
2004

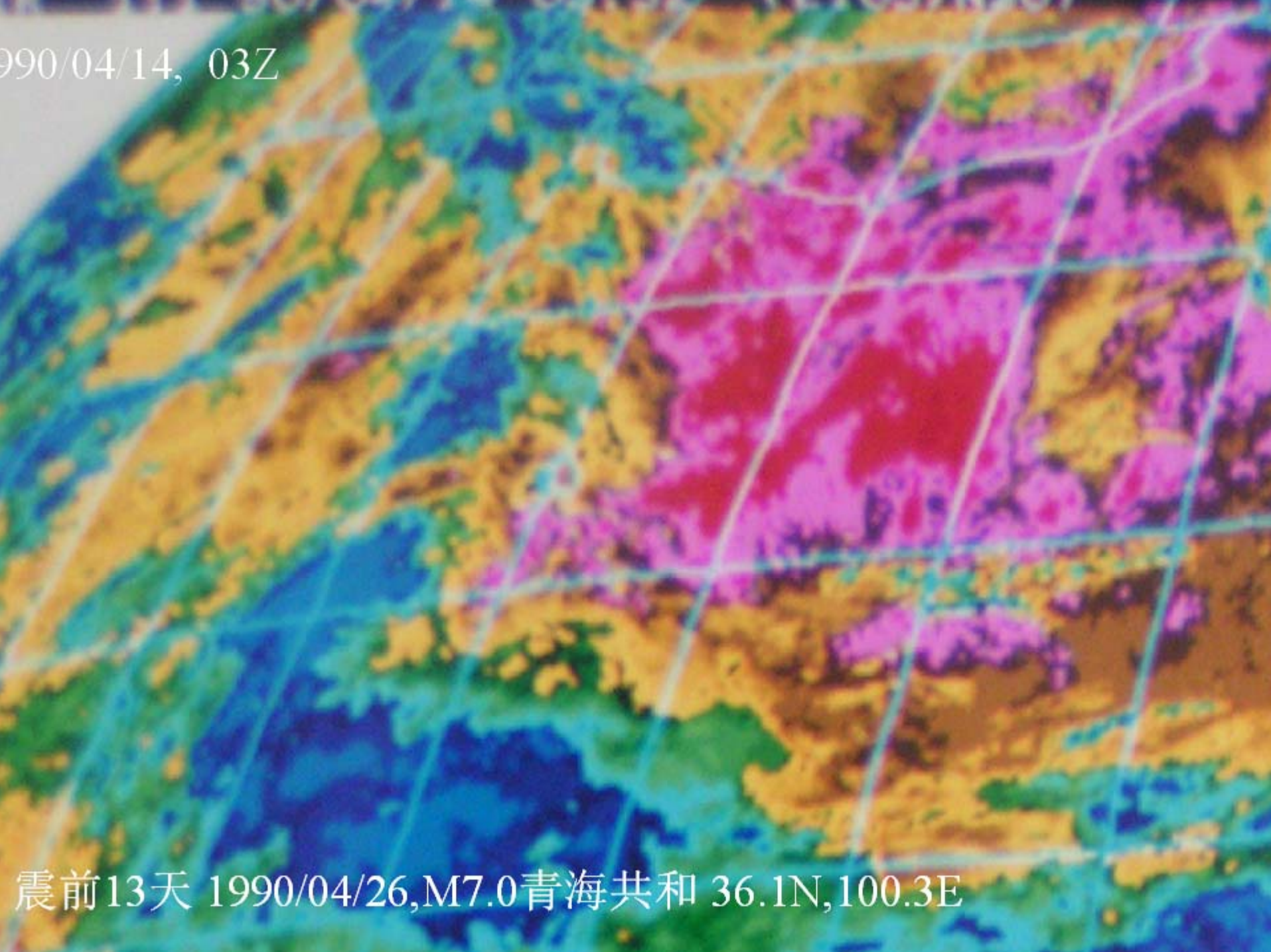

0/04/12,05Z
震前15天 1990/04/26 M7.0 36.1N,100.3E

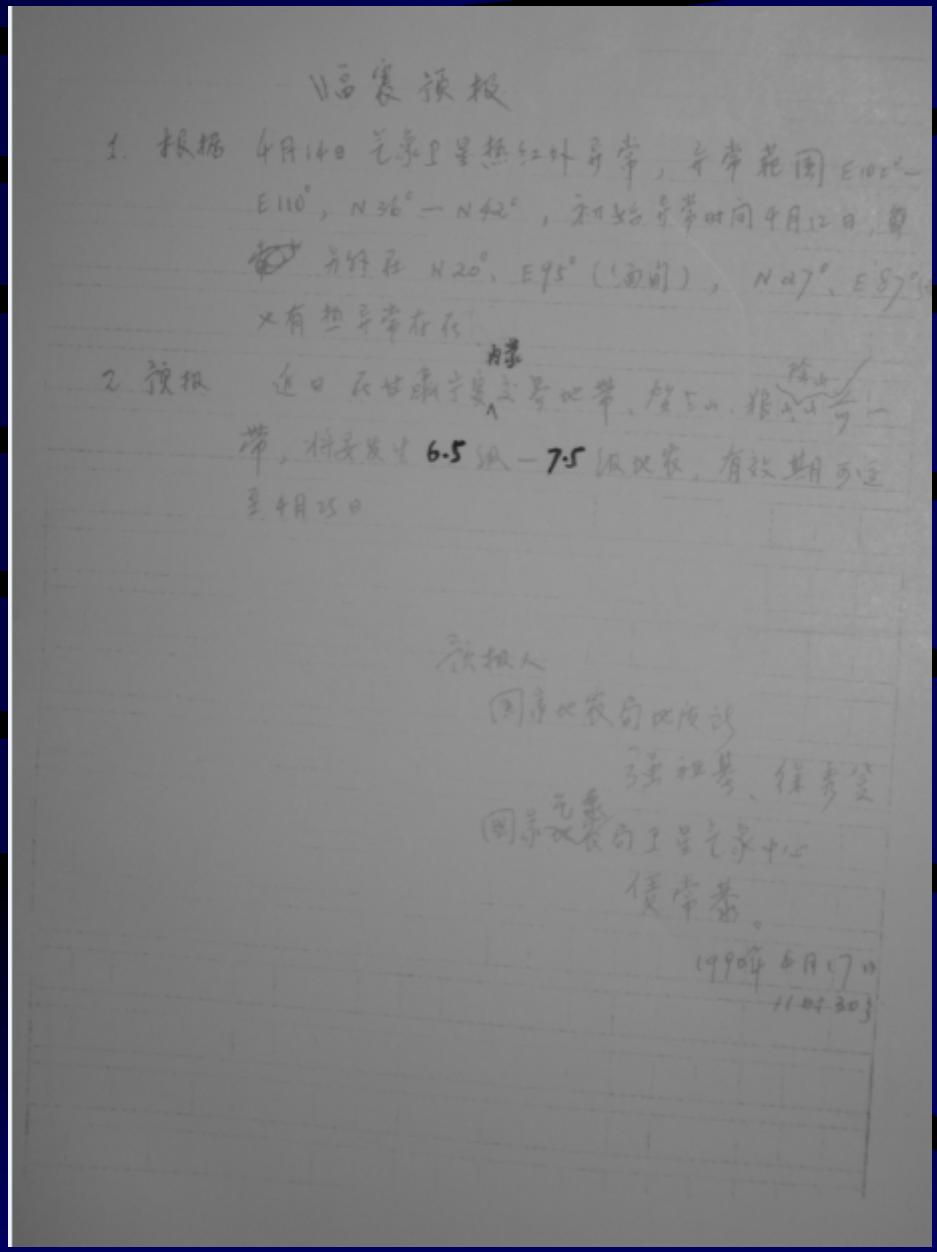

0/04/12,05Z
震前15天 1990/04/26 M7.0 36.1N,100.3E


0/04/12, 08Z
震前15天


90/04/12,12Z
震前15天夜里 M7.0 1990/04/26 36.1N,100.3E


1990/04/13,05Z
震前14天 1990/04/26 M7.0青海共和36.1N,100.3E


990/04/14, 03Z
震前13天 1990/04/26,M7.0青海共和 36.1N,100.3E



临震预报

1. 根据 4月14日 气象卫星热红外异常，异常范围 E102°—E110°，N36°—N42°，初始异常时间4月12日，[illegible] 分解在 N20°、E95°（缅甸），N27°、E87°（[illegible]）又有热异常存在

2. 预报 近日在甘肃宁夏交界地带、贺兰山、狼山、陰山一带，将要发生 6.5 级—7.5 级地震，有效期可延至4月25日

预报人

国家地震局地质所

强祖基、徐秀笑

国家气象局卫星气象中心

侯常基。

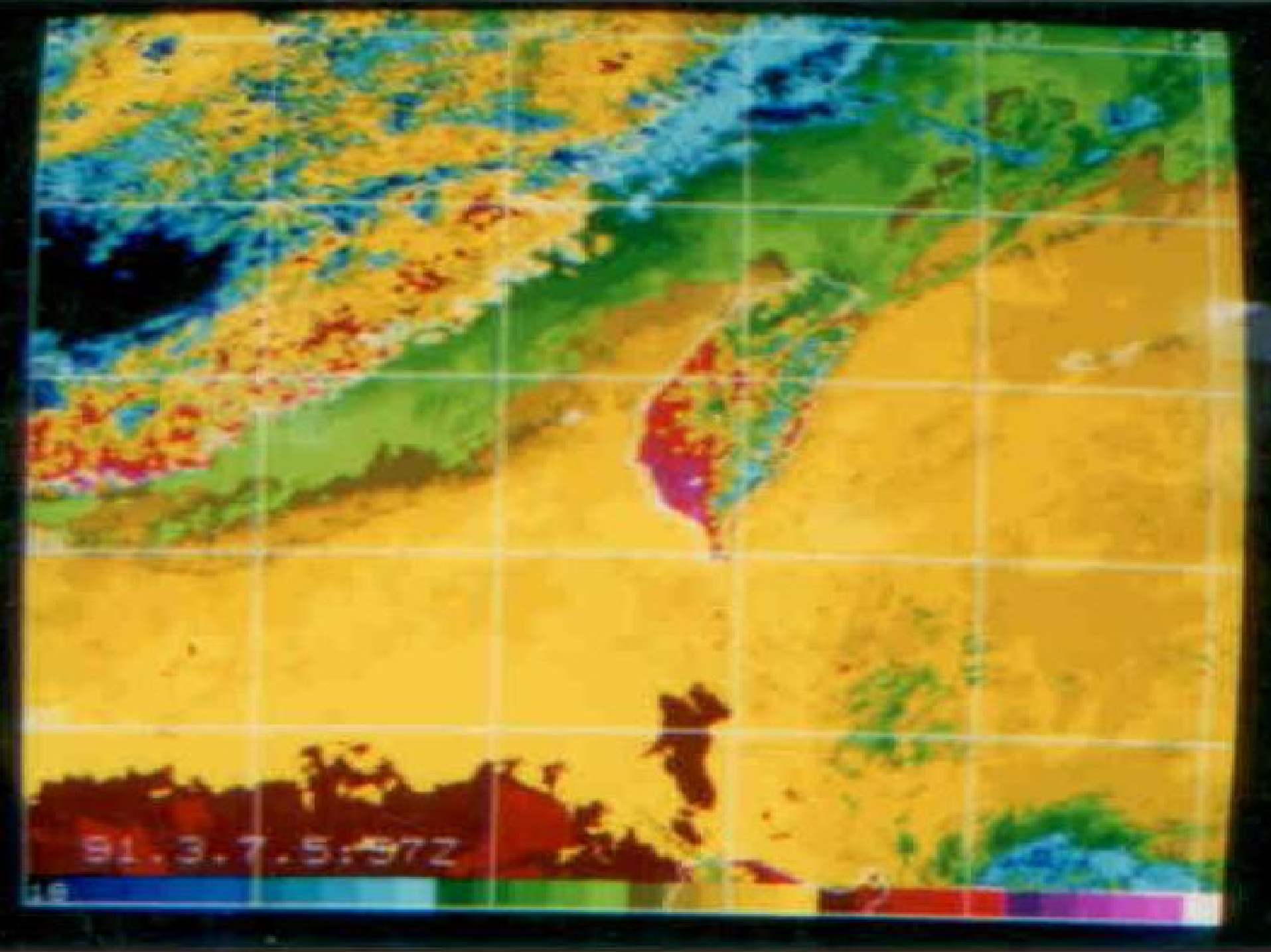
1990年4月17日

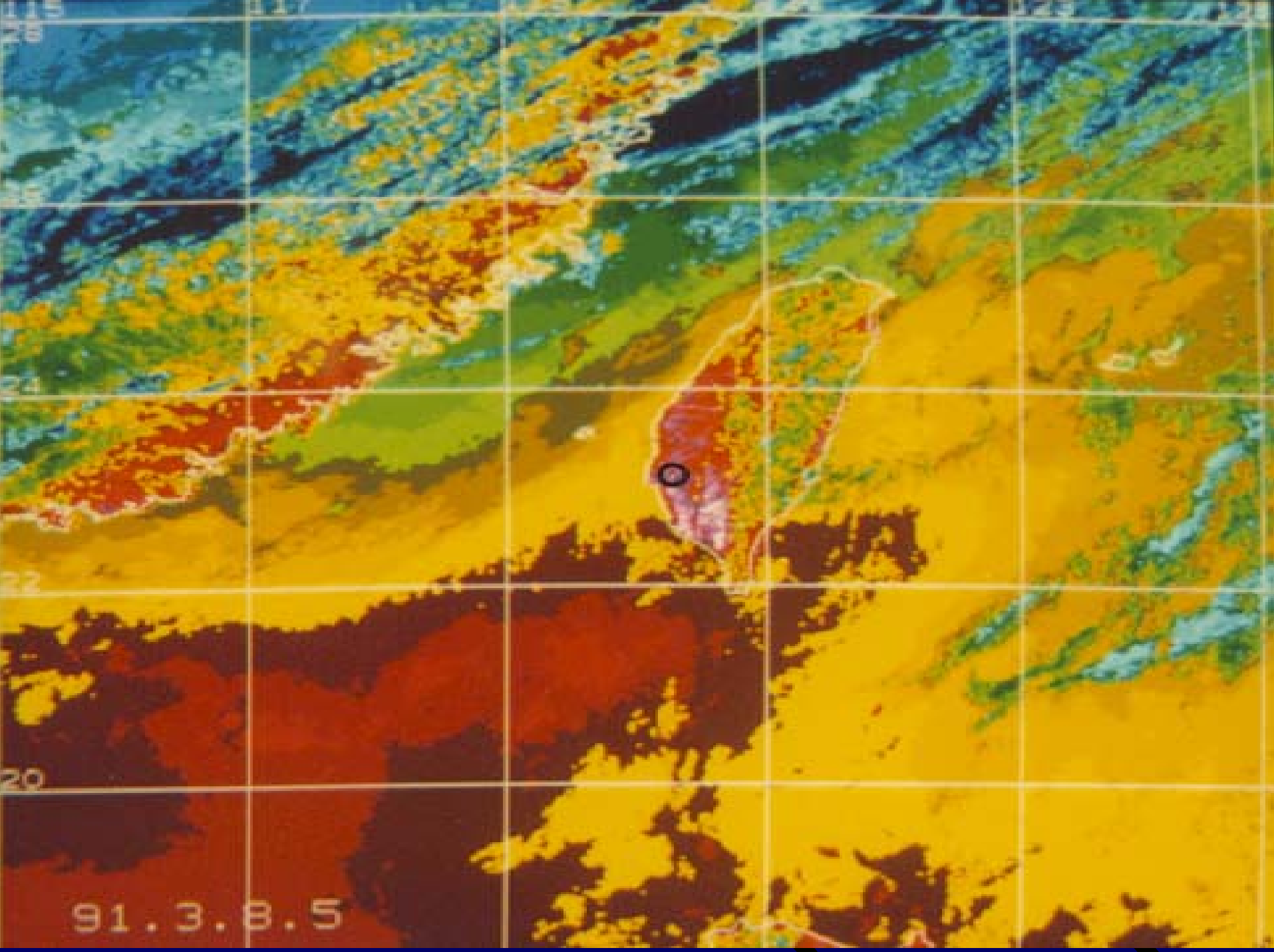
11时30分

Earthquake predicted Card

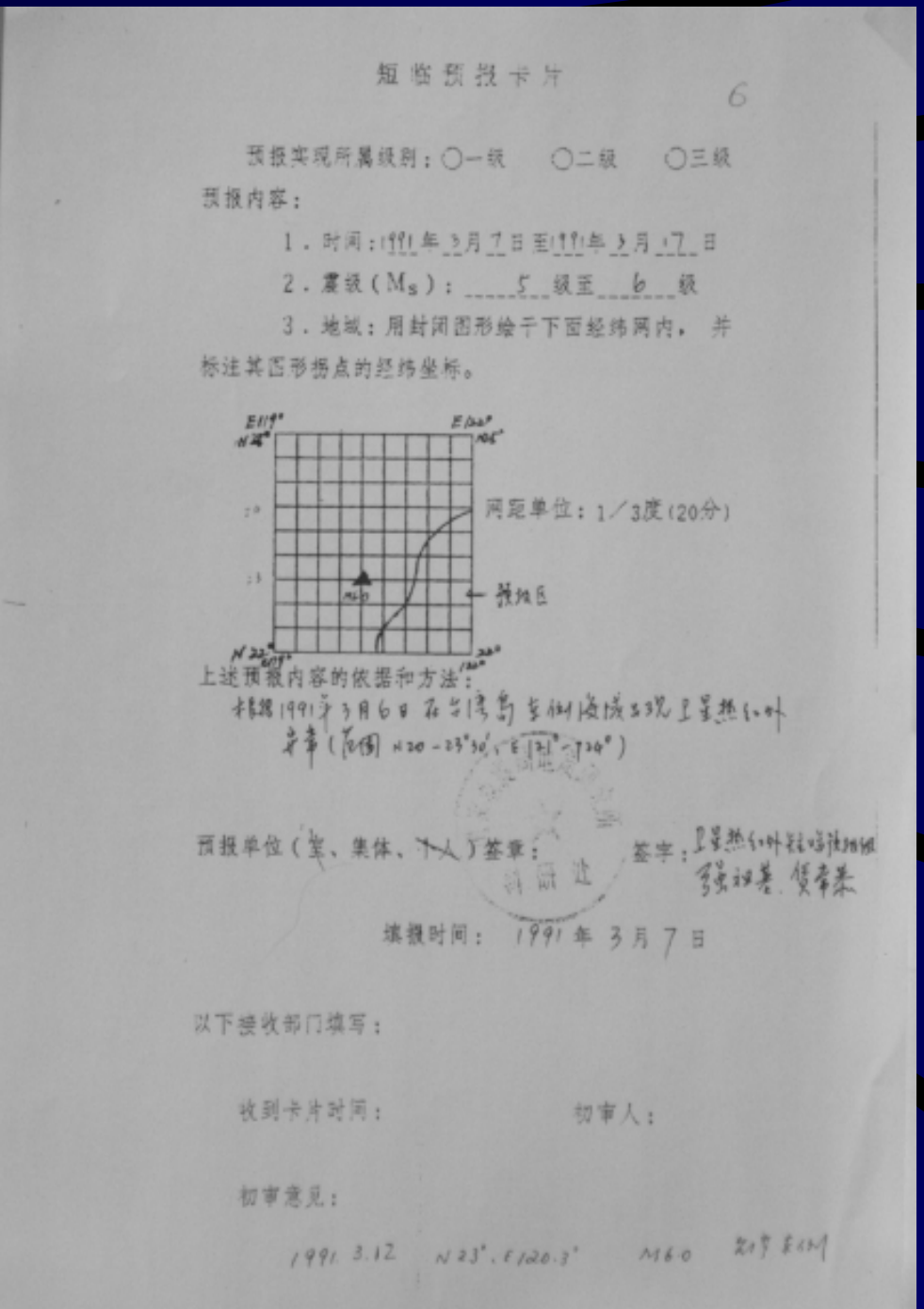
Tainan Earthquake M6.0 Taiwan

- March 12，1991 23°N,120.3°E
- Predicted time March 7-17,6days before
- Area:22-23°N,120-121°E
- Magnitude:5-6
- No.7


91.3.7.5.972


22
20
91.3.8.5

EQ Predicted Card



短临预报卡片

6

预报实现所属级别：○一级　○二级　○三级

预报内容：

1．时间：1991年3月7日至1991年3月17日

2．震级（M_s）：5级至6级

3．地域：用封闭图形绘于下面经纬网内，并标注其图形拐点的经纬坐标。

网距单位：1／3度（20分）

上述预报内容的依据和方法：

根据1991年3月6日在台湾岛东侧海域出现卫星热红外异常（范围 N20－23°30′，E121°－124°）

预报单位（室、集体、个人）签章：　　签字：卫星热红外异常强强组组 [illegible]

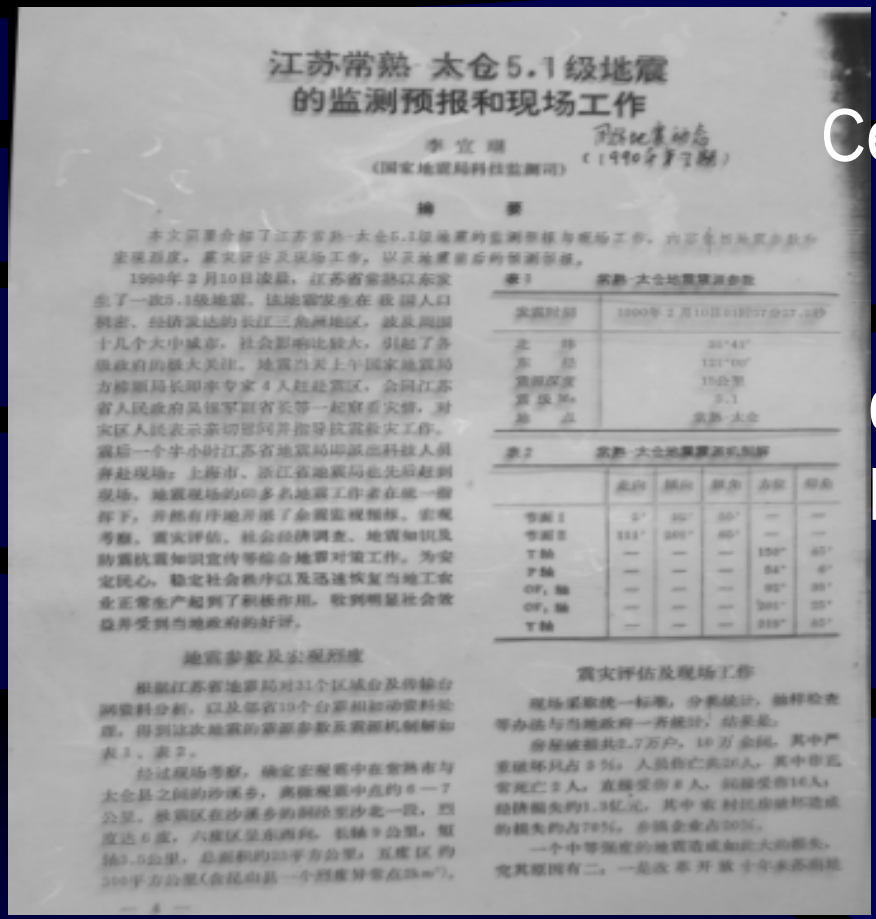
填报时间：1991年3月7日

以下接收部门填写：

收到卡片时间：　　初审人：

初审意见：

1991.3.12　N23°、E120.3°　M6.0　[illegible]



江苏常熟-太仓5.1级地震的监测预报和现场工作

李宜珊

（国家地震局科技监测司）

摘要

1990年2月10日凌晨，江苏省常熟以东发生了一次5.1级地震。该地震发生在我国人口稠密、经济发达的长江三角洲地区，波及周围十几个大中城市，社会影响比较大，引起了各级政府的极大关注。地震当天上午国家地震局方修顺局长即率专家4人赶赴震区，会同江苏省人民政府吴锡军副省长等一起察看灾情，对灾区人民表示亲切慰问并指导抗震救灾工作。震后一个半小时江苏省地震局即派出科技人员奔赴现场；上海市、浙江省地震局也先后赶到现场。地震现场的60多名地震工作者在统一指挥下，并然有序地开展了余震监视预报、宏观考察、震灾评估、社会经济调查、地震知识及防震抗震知识宣传等综合地震对策工作。为安定民心，稳定社会秩序以及迅速恢复当地工农业正常生产起到了积极作用，收到明显社会效益并受到当地政府的好评。

表1 常熟-太仓地震震源参数

发震时间	1990年2月10日01时57分27.2秒
北纬	31°43′
东经	121°00′
震源深度	15公里
震级 M_s	5.1
地点	常熟-太仓

表2 常熟-太仓地震震源机制解

	走向	倾向	倾角	方位	倾角
节面Ⅰ	2°	92°	55°	—	—
节面Ⅱ	111°	201°	40°	—	—
T轴	—	—	—	150°	45°
P轴	—	—	—	54°	6°
OF_1轴	—	—	—	92°	35°
OF_2轴	—	—	—	201°	55°
T轴	—	—	—	319°	45°

地震参数及宏观烈度

根据江苏省地震局对31个区域台及传输台网资料分析，以及邻省19个台震相初动资料处理，得到这次地震的震源参数及震源机制解如表1、表2。

经过现场考察，确定宏观震中在常熟市与太仓县之间的沙溪乡，离微观震中点约6—7公里。极震区在沙溪乡的洞经至沙北一段，烈度达6度，六度区呈东西向，长轴9公里，短轴3.5公里，总面积约23平方公里，五度区约300平方公里（含昆山县一个烈度异常点2km²）。

震灾评估及现场工作

现场采取统一标准，分类统计，抽样检查等办法与当地政府一齐统计，结果是：

房屋破损共2.7万户，10万余间，其中严重破坏只占3%，人员伤亡共26人，其中伤亡常死亡2人，直接受伤8人，间接受伤16人，经济损失约1.3亿元，其中农村民房破坏造成的损失约占70%，乡镇企业占20%。

一个中等强度的地震造成如此大的损失，究其原因有二：一是改革开放十年来苏南地

Certificate Of Prediction Accuracy issued by vice director of department of Earthquake Prediction, CEA

国家地震局在接待以墨田隆二为团长的日本航空宇宙工业会代表团时，当听取了"卫星热红外增温前兆——地震短临预报"、"遥感红外岩石破裂实验研究"等专题介绍后，日本客人说："想不到在利用航天技术方面，中国在地震研究方面超过了我们"。

作为国家地震局"八五"科技攻关项目，在经费严重不足的情况下，该项研究能够取得为世界同行称赞的进展，这与国家科委高技术司、国防科工委、地震科学联合基金会、振兴中华教育科学基金会(侨办)以及何鸿燊航天科技人材培训基金会的大力支持密不可分；同时，改革开放的政策也发挥了巨大的作用，国家气象局发扬大协作精神，不计报酬地为研究人员提供了大量的卫星图片资料。

目前，卫星热红外地面增温作为地震短临前兆的研究还是初步的，仍有许多问题有待深入研究，如云层干扰问题、异常机制问题以及扩大监视范围问题等。我们深信，随着我国航天技术的发展和科研人员的不懈努力，一定能拿出高水平的研究成果，为人类利用航天技术对抗地震自然灾害做出更大贡献。

(国家地震局科技监测司　李宣源)

拉恰地震的追踪

斯特拉霍夫(В. Н. Страхов)

1991年4月29日发生的拉恰地震是高加索整个地震观测历史上最强的地震。在地震区内，过去一般没有预报过如此巨大能量的地震(震级的为7级)，即这次地震又一次填补了现有的普通地震区划图的不足之处。

实际上，在1988年斯皮塔克地震后就编制了临时的高加索地震危险图，参与编制此图的有：俄罗斯地球物理研究所及其他地质、地震研究所和外高加索地区有关机构的专家。在这张图上，大高加索的整个南坡都是地震的9度区。而在未来地震所在的地区，即格鲁吉亚的拉恰和南奥塞季(Юзной Осетии)，则划出了长期的地震警报区。但是，由于在得到对某地区强震的科学预报时，还没有制定出具体的管理机制，这使得政府不能为所预报的地震灾害做好准备。

也就是说，社会还不能在实际上利用地震预报领域的科学结果(即使是不很完善的)，这就是拉恰地震的第一个教训。

这次地震以后已经很清楚，高加索已进入地震的活跃期。在近90年里(由1902年的谢马哈地震算起)，这里没有发生过这样的强震。然而，现在就在这里，3年内就发生了两次。如果考虑斯皮塔克和拉恰地震后大量的剩余震以及第比利斯东北方向100 km的1992年强震，则无可置疑，地球内部的地震激发过程已经开始，而且它正在沿高加索地域逐渐扩展。

在分析地震震情的基础上，某些地震学家得出结论，认为这里在不久的将来可能发生强震。但是，由于苏联的解体及普通的政局不稳定，统一的区域地震台网分裂了，致使对高加索震情不能进行完整的监测。因此，当时也未必能够及时查明下次地震的地点，这是拉恰地震的第二个教训。

若干年前，两位著名的美国学者P. C. Стейн和P. C. Йен曾推出"盲"地震的危险性，这种地震的震源与未出露地面的地质结构的活动有关。拉恰地震看来就是这种"隐伏"地震。几个月的野外工作结果，以及俄罗斯、格鲁吉亚、法国、英国和美国专家在震中区进行的地质、地球物理观测的结果都能证明这一观点。

这里使用了最先进的仪器和研究方法，仍未能找到大断裂(地壳内的尖缝)，其运动可能孕育拉恰地震的震源。但是，在地下5—10 km

— 31 —

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Hualiang Earthquake M6.8 Taiwan

- April 20,1992 23.8°N,121.7°E
- Predicted time April 17-27,4days before
- Area:23-24°N,121-122.5E
- Magnitude:6.0-6.5
- No.14

EQ Predicted Card

类别：A　　部门（盖章）国家地震局地质研究所 科研处

年：1992.4.17　编号：92[illegible]

19

1992. 4. 20　M6.8　台湾花莲海外

N 23.8

E 121.7

会商时间：1992.4.17　地点：五楼

主持人：[illegible]

预报意见：[illegible]

时间：[illegible]

区域：[illegible]

震级：[illegible]

上报时间和部门：[illegible]

说　明

1. 类别：指分析预报工作管理条例第21条中的A、B、C、D四类。
2. 预报意见：
   A类必须明确填报地震可能发生的时间段（三个月内），哪些地县区域以及震级范围。
   B类必须明确填报地震可能发生的若干地县区域范围和震级范围，时间至少为几个月以上，甚至二、三年。
   C类只指出未来一定时间内可能发生中强以上或较大地震。区域范围可较大。
   D类必须明确指出未来一定时间某区域范围内没有破坏性地震或可能引起较强社会反应的地震发生。
3. 预报效果评价包括地震活动实况、三要素预报的正确程度、预报依据的科学性以及决策能力评估。

科技日报

SCIENCE AND TECHNOLOGY DAILY 代号 1—97

1993年8月13日 星期五 癸酉年六月廿六 总第2567期 国内统一刊号 CN11—0078

●卫星遥感临震预报研究有进展

●国产字幕机独揽七运会直播

●天然药物地理学研究日臻成熟

本报讯 由国家地震局地质所承担的"八五"科技攻关项目，"卫星遥感热红外临震异常的研究"，目前已取得较大进展。

这项研究主要利用卫星遥感数据中热红外图象的处理技术，采集临震温度的信噪比，进行地震临震大气温室气体采样分析，目的是发现地震前卫星热红外增温前兆，从而提高地震的临震预报准确性。

自去年以来，该专题在卫星遥感图象分析、排除云层干扰、利用热红外波段结合气象台站气温资料进行临震预报方面取得较好的进展。截止今年8月，已采用该方法进行地震预报多次，其中较准确和较好预报的有4次，1992年4月20日花莲东海域M6.8级地震，1992年5月1日、4日花莲东海域M4.6和M4.5级地震，1993年3月20日西藏拉孜M6.5级地震和1993年8月8日日本北海道的M6.6级地震。

据了解，该项目研究组还结合其他方法，就

建佳绩。北京亚运前夕，中央电视台独具胆识，让刚刚起步的大洋公司承担占金牌总数80%比赛项目现场直播的动画字幕播出任务。大会期间，盛况壮景通过大洋特技字幕机化作特技字幕和电脑动画，以与光电同步的速度最先传递盛况信息，得到亚广联官员的高度赞誉。

今年5月，首届东亚运动会召开之前，他们又开发出具有九十年代国际先进水平的全新功能通用体育转播软硬件系统。 （孙 莽）

本报讯 记者贾晓慧、通讯员李洪生报道：我国近年来崛起的天然药物地理学已日臻成熟。最近修订出版的《天然药物地理学》使这一新兴的边缘学科更加完整，同时也为我国天然药物资源的保护和持续利用提供重要的理论基础和科学依据。

天然药物地理学从多学科角度研究土壤气候、环境等相关因素变化对天然药物生长和药

谁先抱个"金娃娃"。

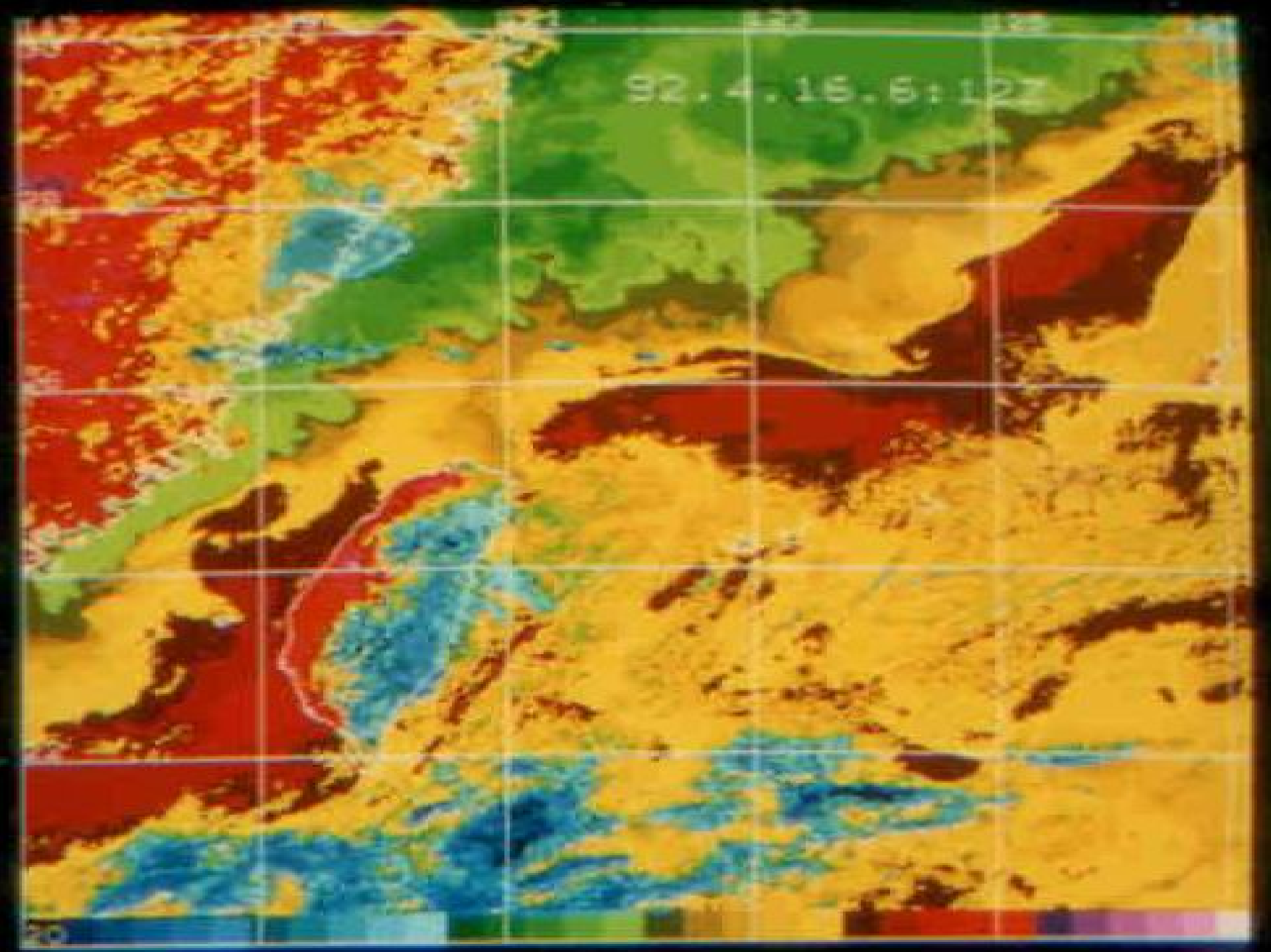
今年7月20日，宁夏建筑离职"的暂行规定）紧急出台半年，这个院已有36名骨干人不辞而别。这家与自治区同等位，目前正面临生存危机。

在此同时，受自治区政府外流情况的调查也在进行。建筑设计院人才外流的严重状况遍存在。仅去年以来，宁夏大学院和附院流失72人，宁夏轻人……

追溯过去，人才外流一直地区的难点和热点。80年代初期、中期和90年代初期，是宁夏人才外流的三个高峰期，其中最高一年流出和流进的差额达502人，累计差额逾2500人。

成熟人才的流失如此，潜人才的流失更为严重。近三年，外地就读的宁夏籍大学生的返回率已从75%下降到去年的65%和今

不可否认，"市场"使人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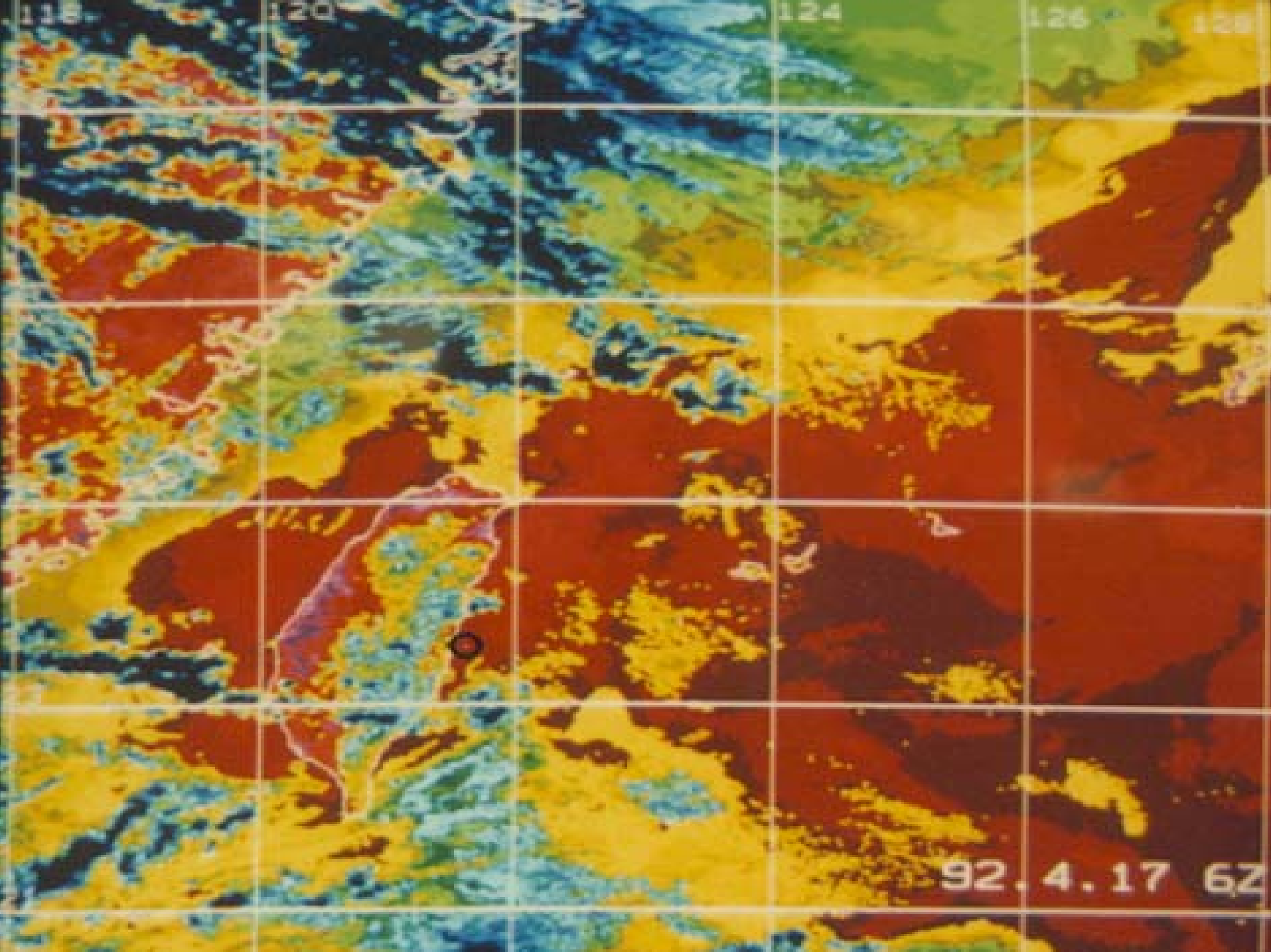
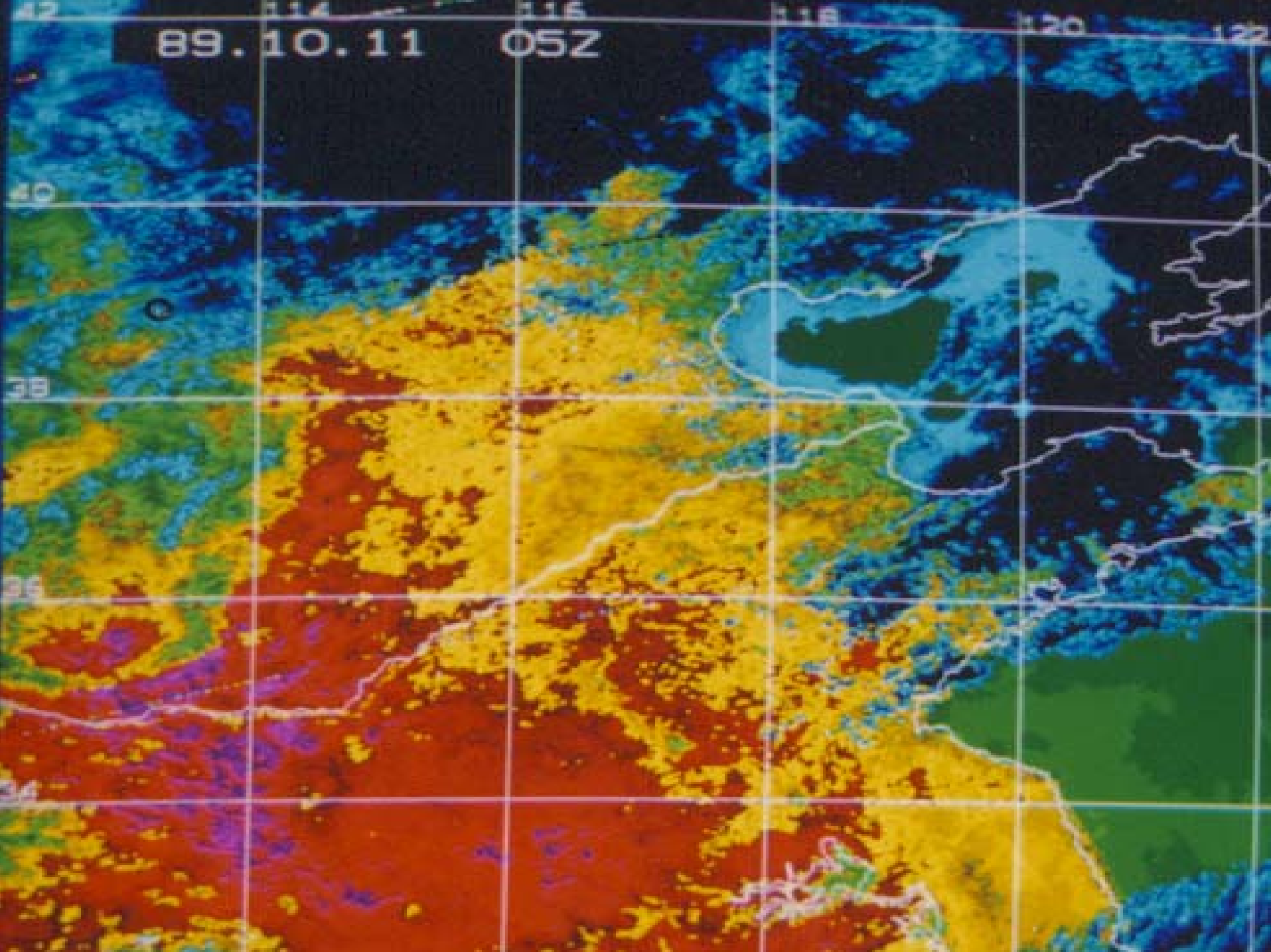
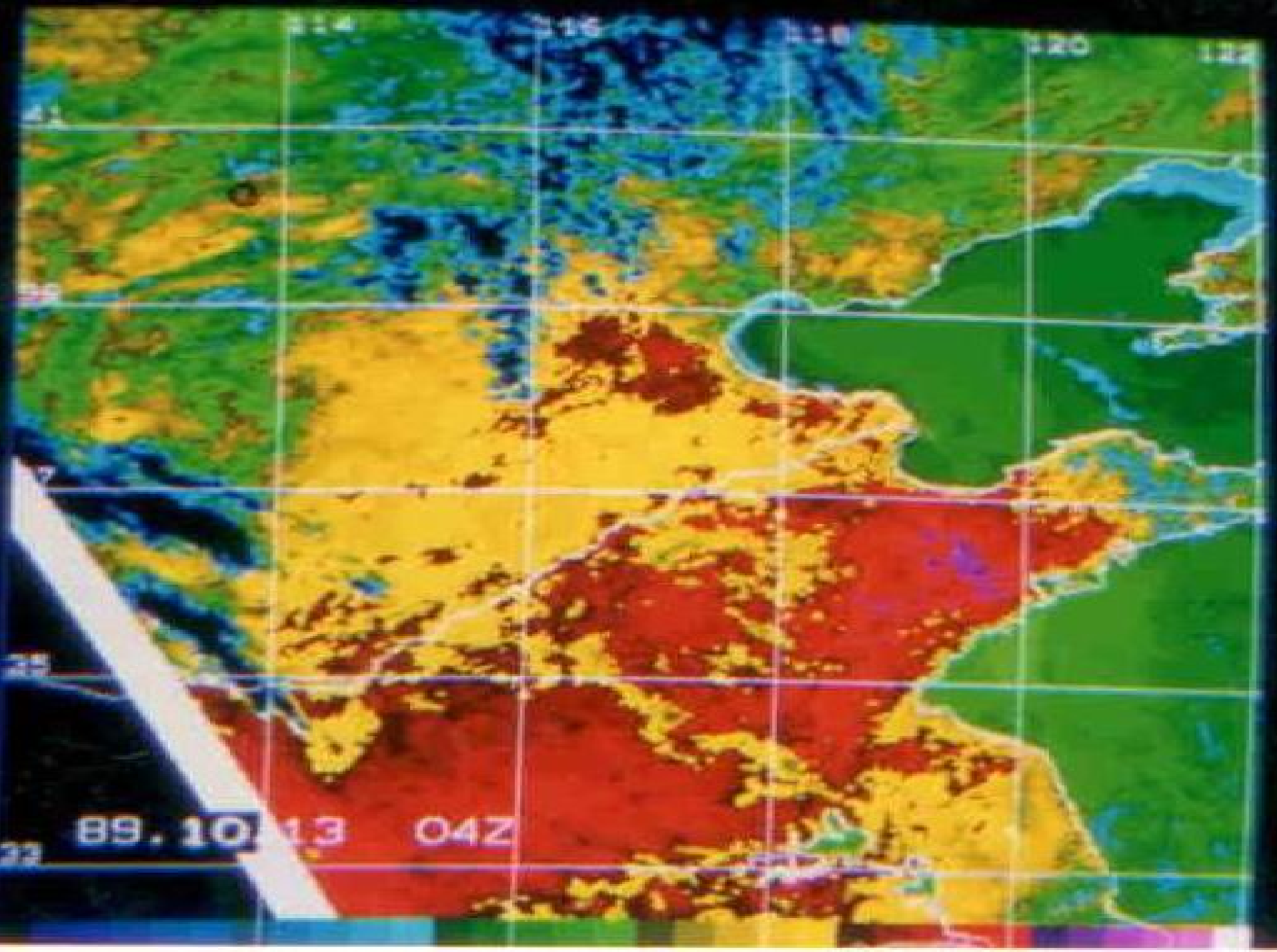

118
120
124
126
92.4.17 6Z

Datong EarthquakeM5.7,6.1

- Oct.18,19;1989 39.9°N,113°E
- Oct.23;1989　Strong aftershock M5.2


89.10.11 052

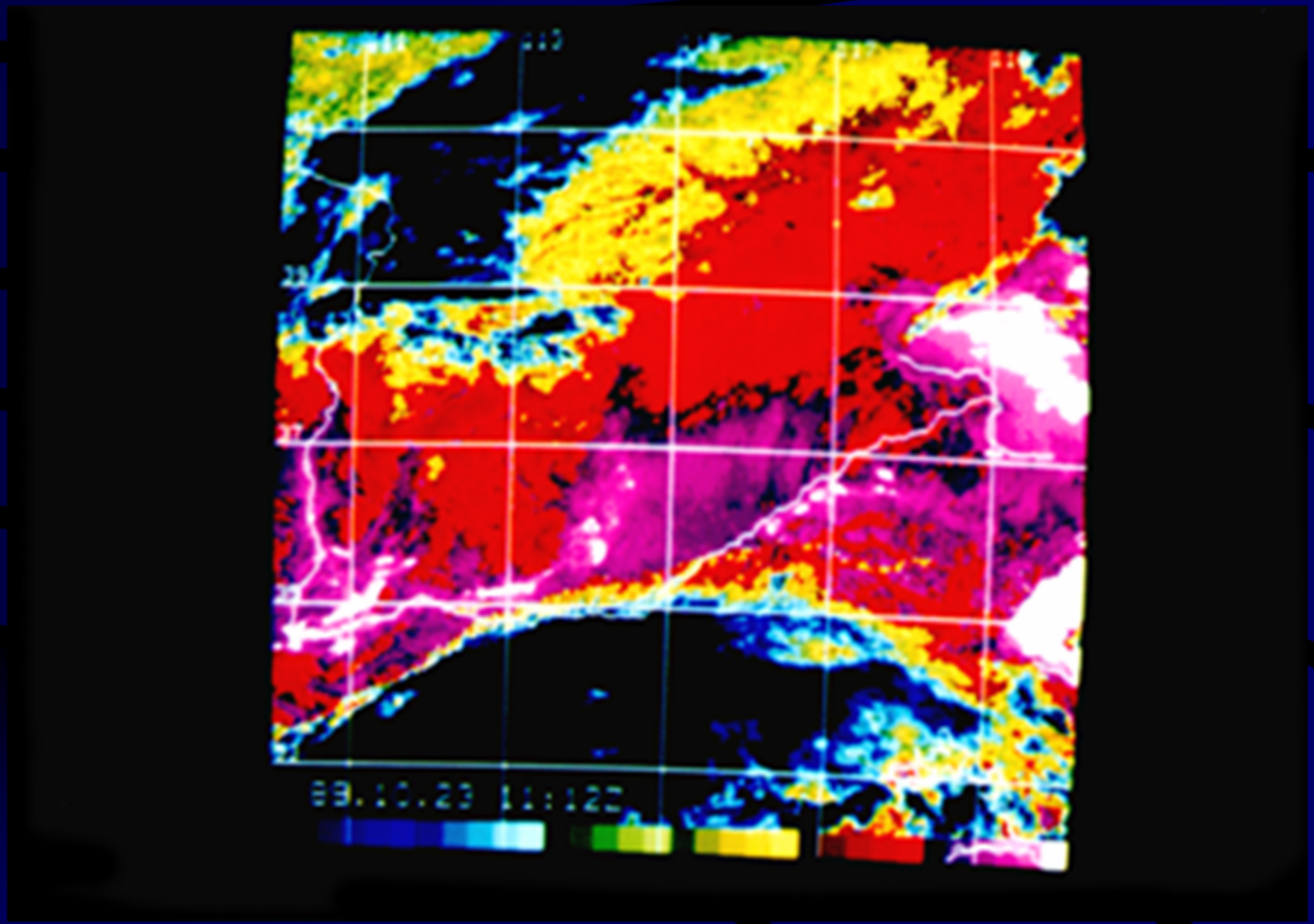

89.10 13 04Z

Strong after shock M5.2

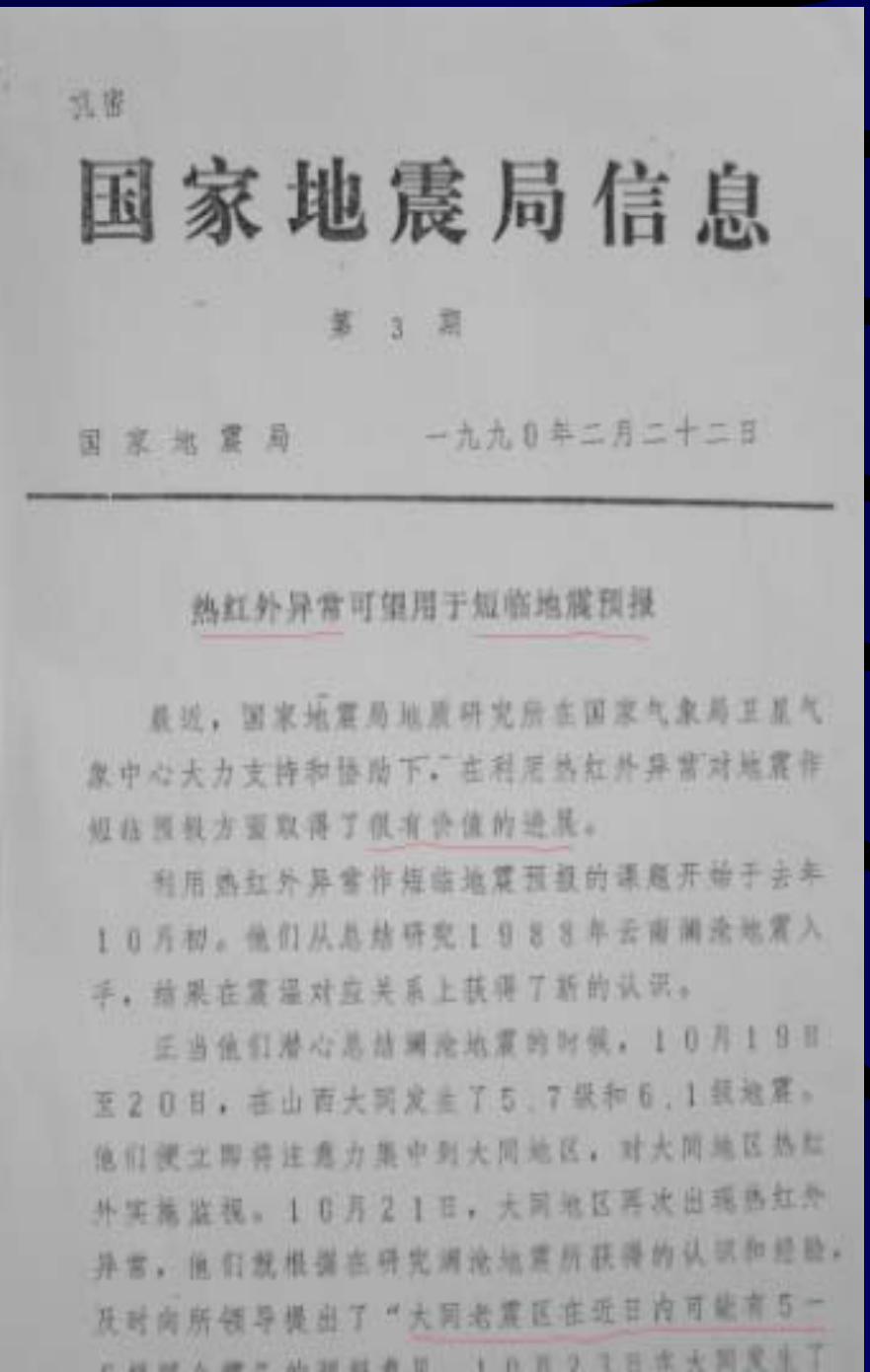
Oct.23;1989

Predicted time Oct.21 1989

Datong --11:12GMT, Oct. 23, 1989.2h. Before aftershock



Start temp. 260K



内部

国家地震局信息

第 3 期

国家地震局　　一九九〇年二月二十二日

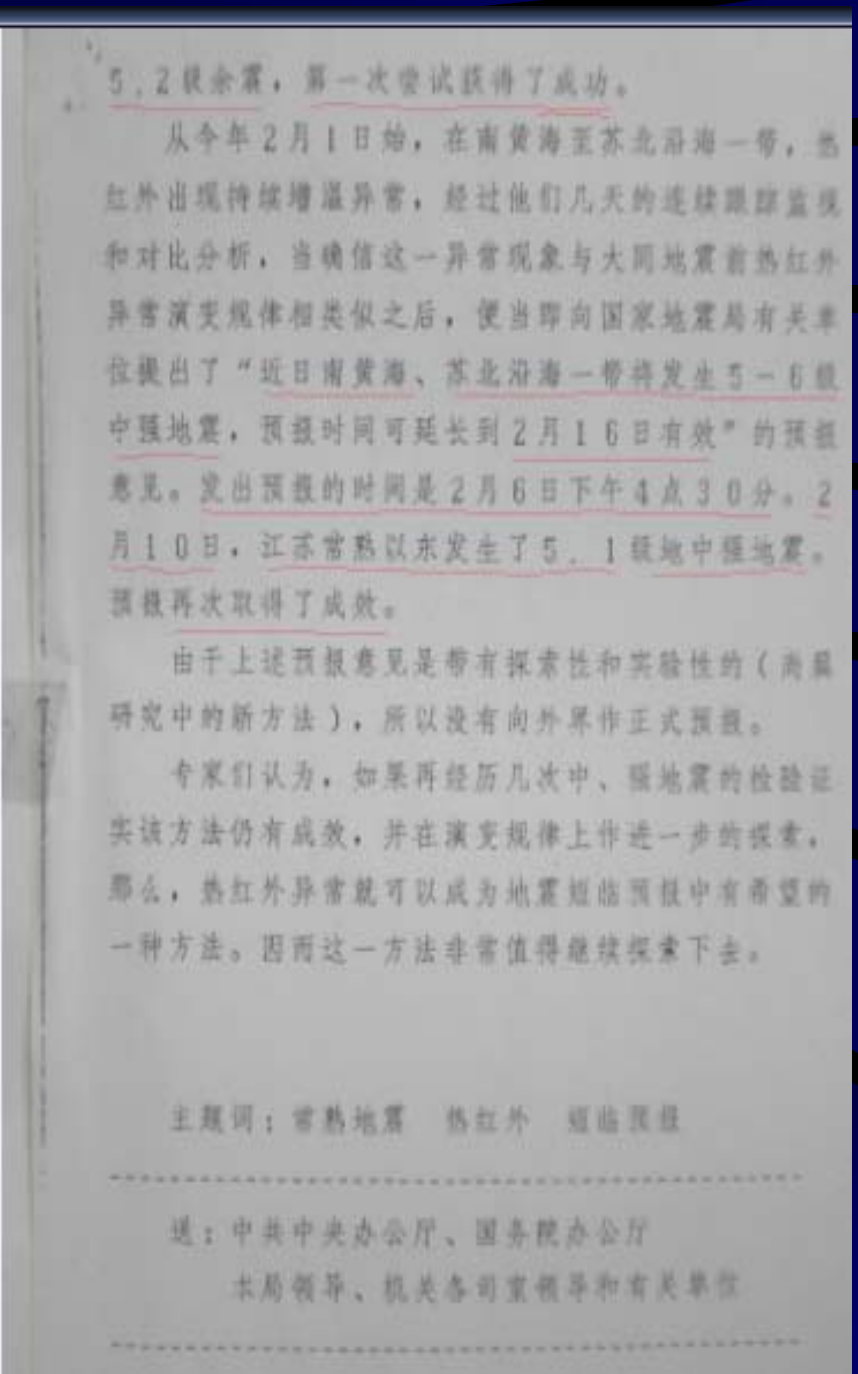
热红外异常可望用于短临地震预报

最近，国家地震局地质研究所在国家气象局卫星气象中心大力支持和协助下，在利用热红外异常对地震作短临预报方面取得了很有价值的进展。

利用热红外异常作短临地震预报的课题开始于去年10月初。他们从总结研究1988年云南澜沧地震入手，结果在震温对应关系上获得了新的认识。

正当他们潜心总结澜沧地震的时候，10月19日至20日，在山西大同发生了5.7级和6.1级地震。他们便立即将注意力集中到大同地区，对大同地区热红外实施监视。10月21日，大同地区再次出现热红外异常，他们就根据在研究澜沧地震所获得的认识和经验，及时向所领导提出了“大同老震区在近日内可能有5－

Certificate Of Prediction Accu racy issued by vice director of department of Earthquake Prediction, CEA



5.2级余震，第一次尝试获得了成功。

从今年2月1日始，在南黄海至苏北沿海一带，热红外出现持续增温异常，经过他们几天的连续跟踪监视和对比分析，当确信这一异常现象与大同地震前热红外异常演变规律相类似之后，便当即向国家地震局有关单位提出了“近日南黄海、苏北沿海一带将发生5－6级中强地震，预报时间可延长到2月16日有效”的预报意见。发出预报的时间是2月6日下午4点30分。2月10日，江苏常熟以东发生了5.1级地中强地震。预报再次取得了成效。

由于上述预报意见是带有探索性和实验性的（尚属研究中的新方法），所以没有向外界作正式预报。

专家们认为，如果再经历几次中、强地震的检验证实该方法仍有成效，并在演变规律上作进一步的探索，那么，热红外异常就可以成为地震短临预报中有希望的一种方法。因而这一方法非常值得继续探索下去。

主题词：常熟地震　热红外　短临预报

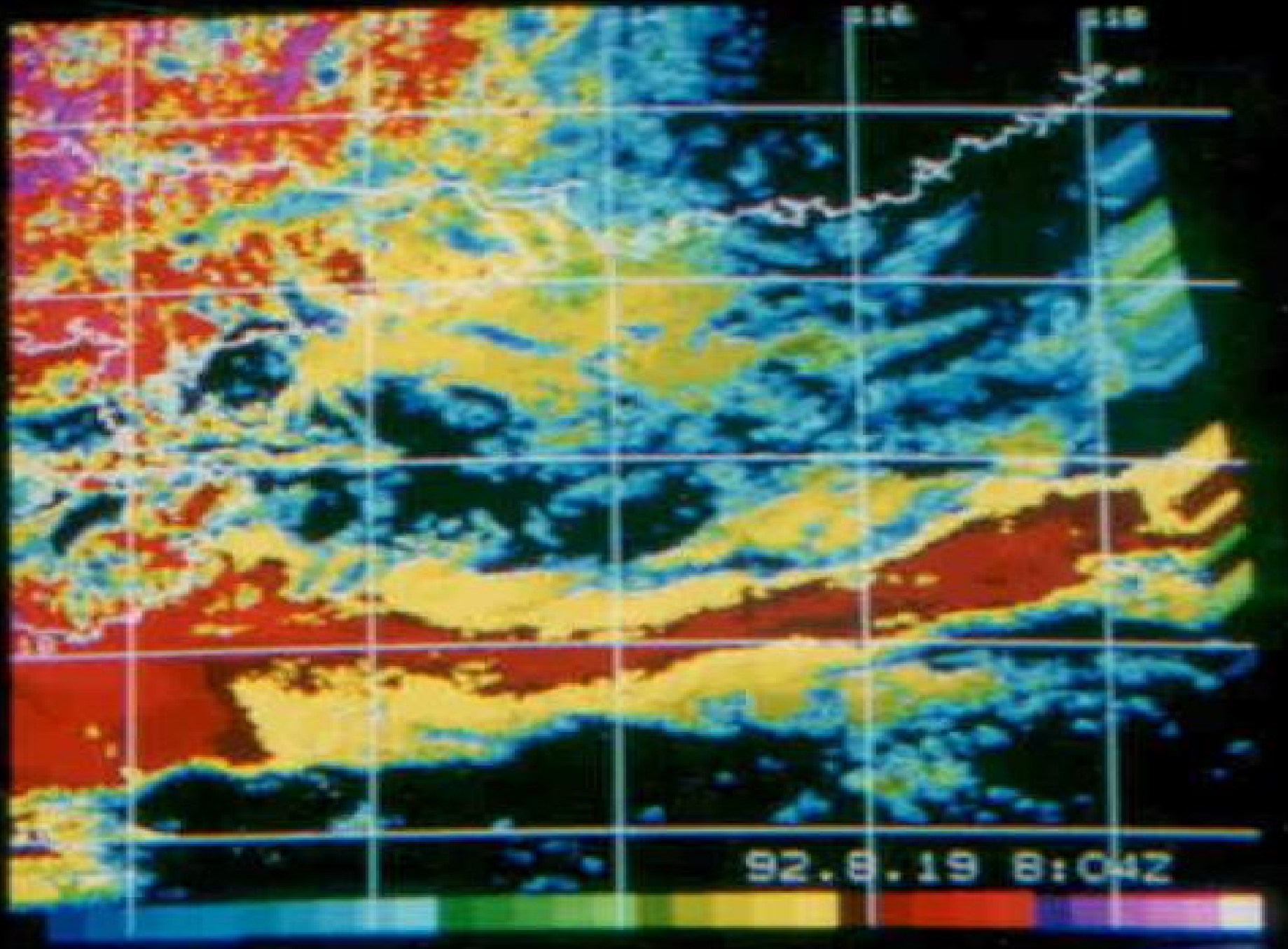
送：中共中央办公厅、国务院办公厅

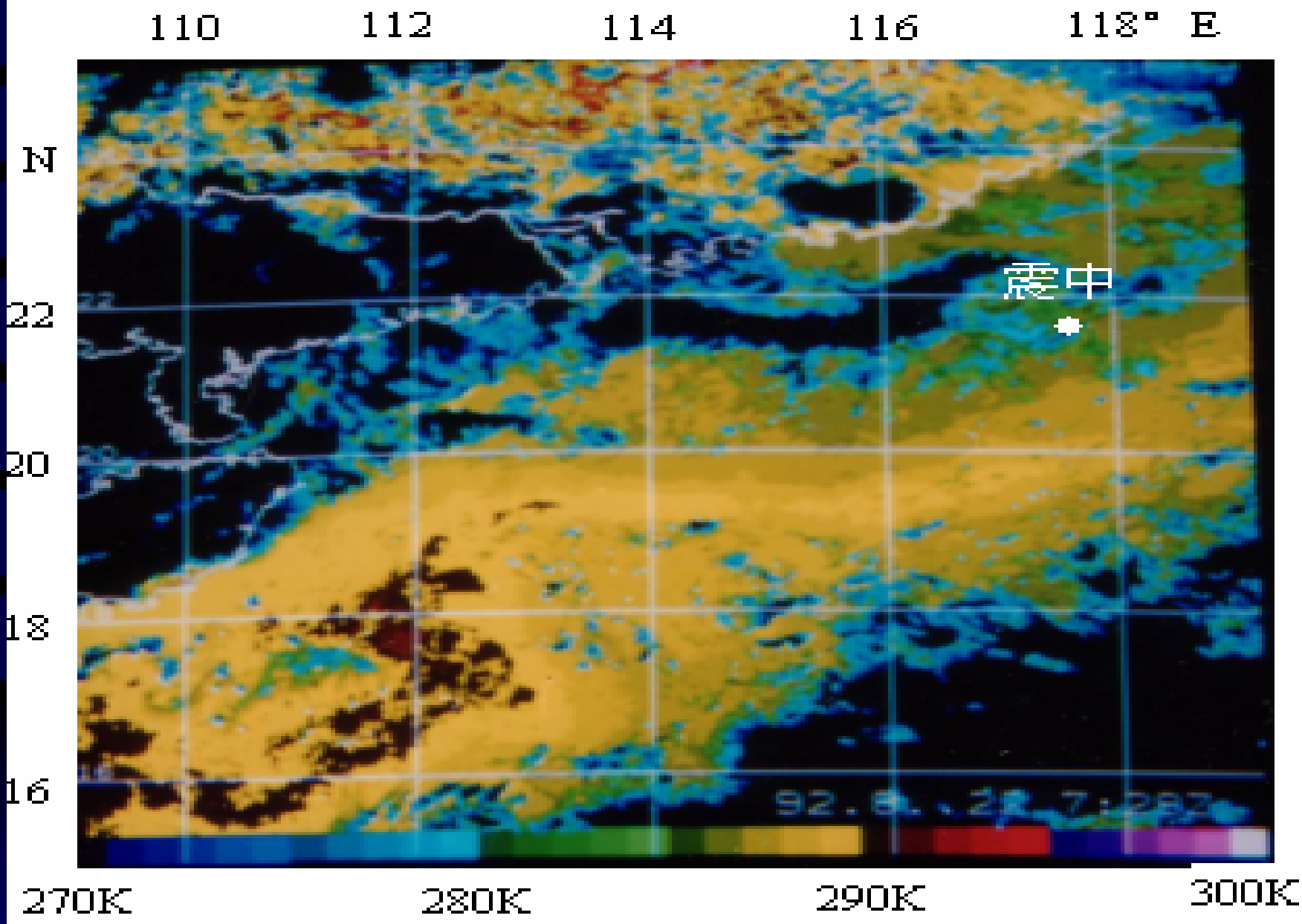
本局领导、机关各司室领导和有关单位

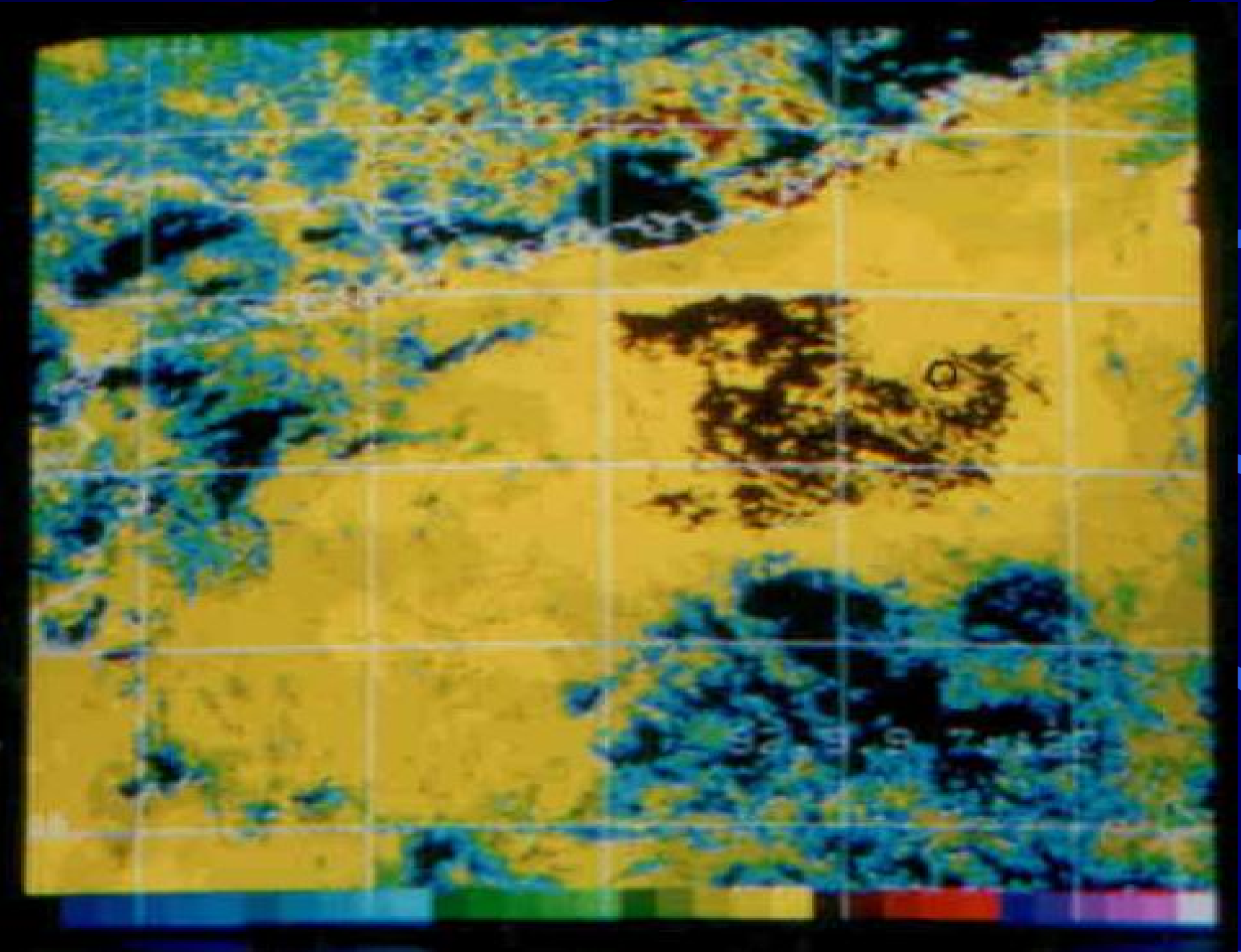
Certificate Of Prediction Accu racy issued by vice director of department of Earthquake Prediction, CEA

Dongsha EarthquakeM5.9 China Southern Sea

- Sept.14,1992; 21.6°N,117.8°E
- Predicted time:Aug.19-Sept.9,1992
- Magnitude:6.0
- Area:21-22°N,117-119°E
- No.17

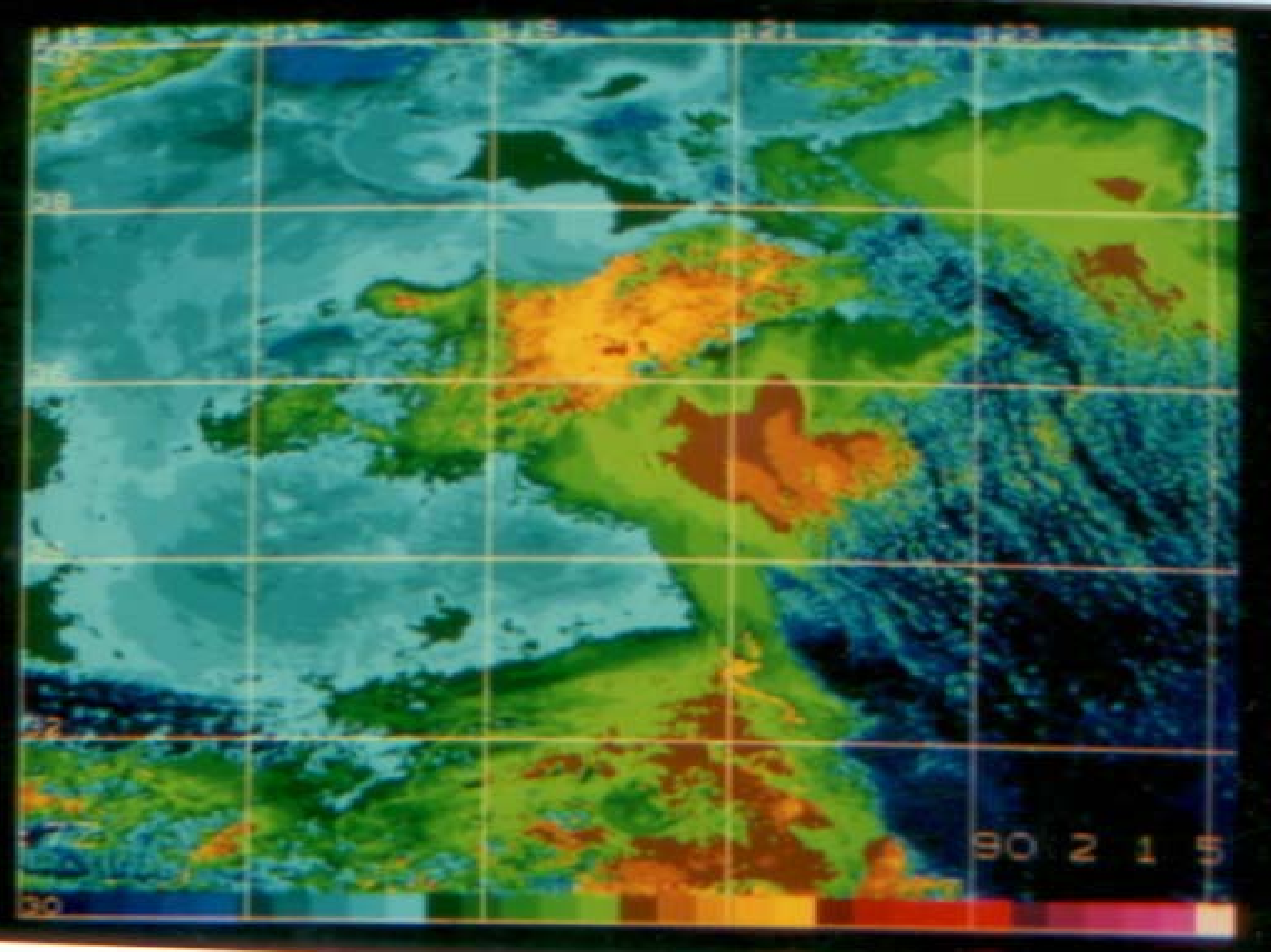

92.8.19 8:04Z

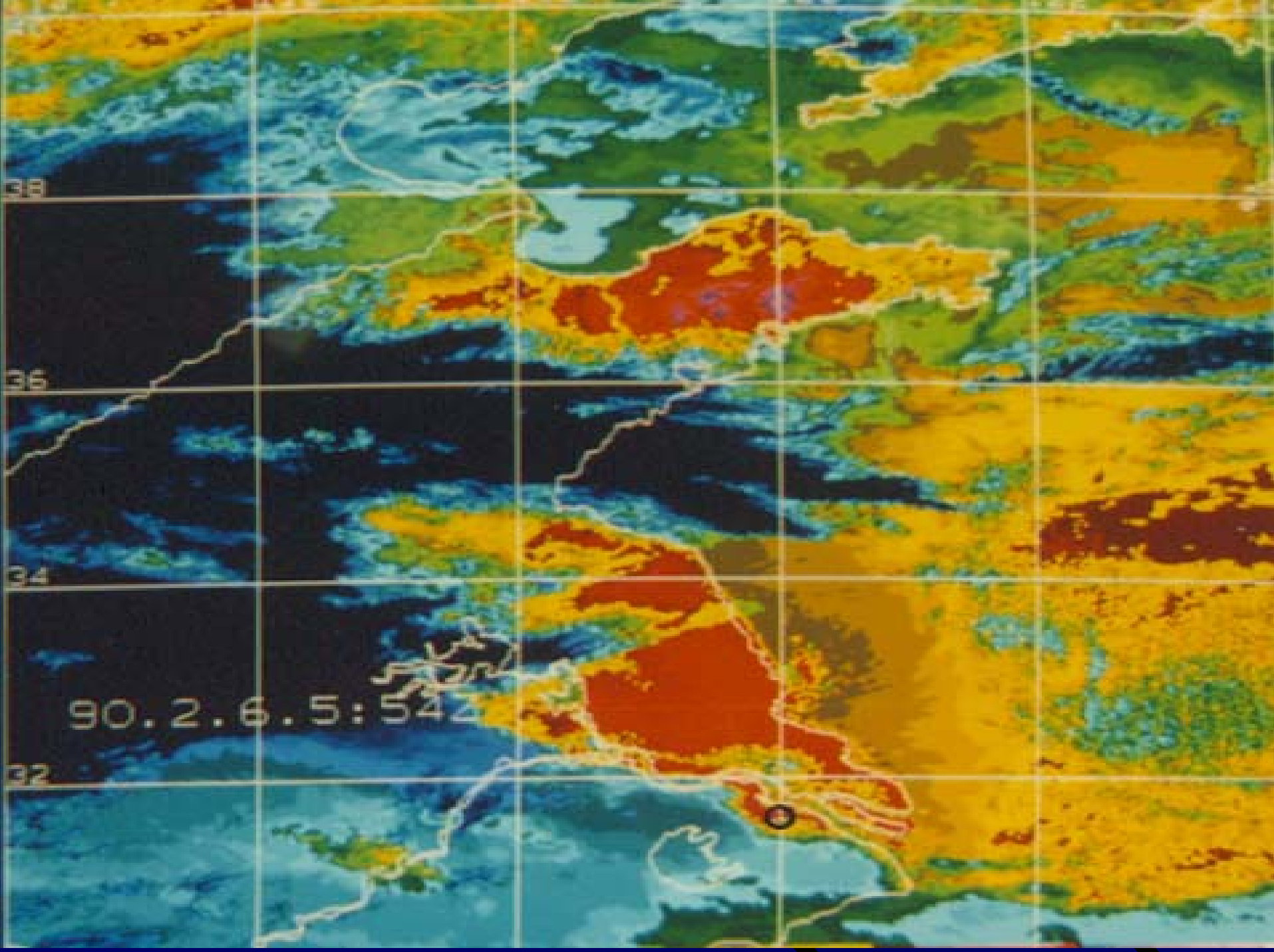

110
112
114
116
118° E
N
22
20
18
16
震中
270K
280K
290K
300K
1992-Aug.22,20:01(GMT)

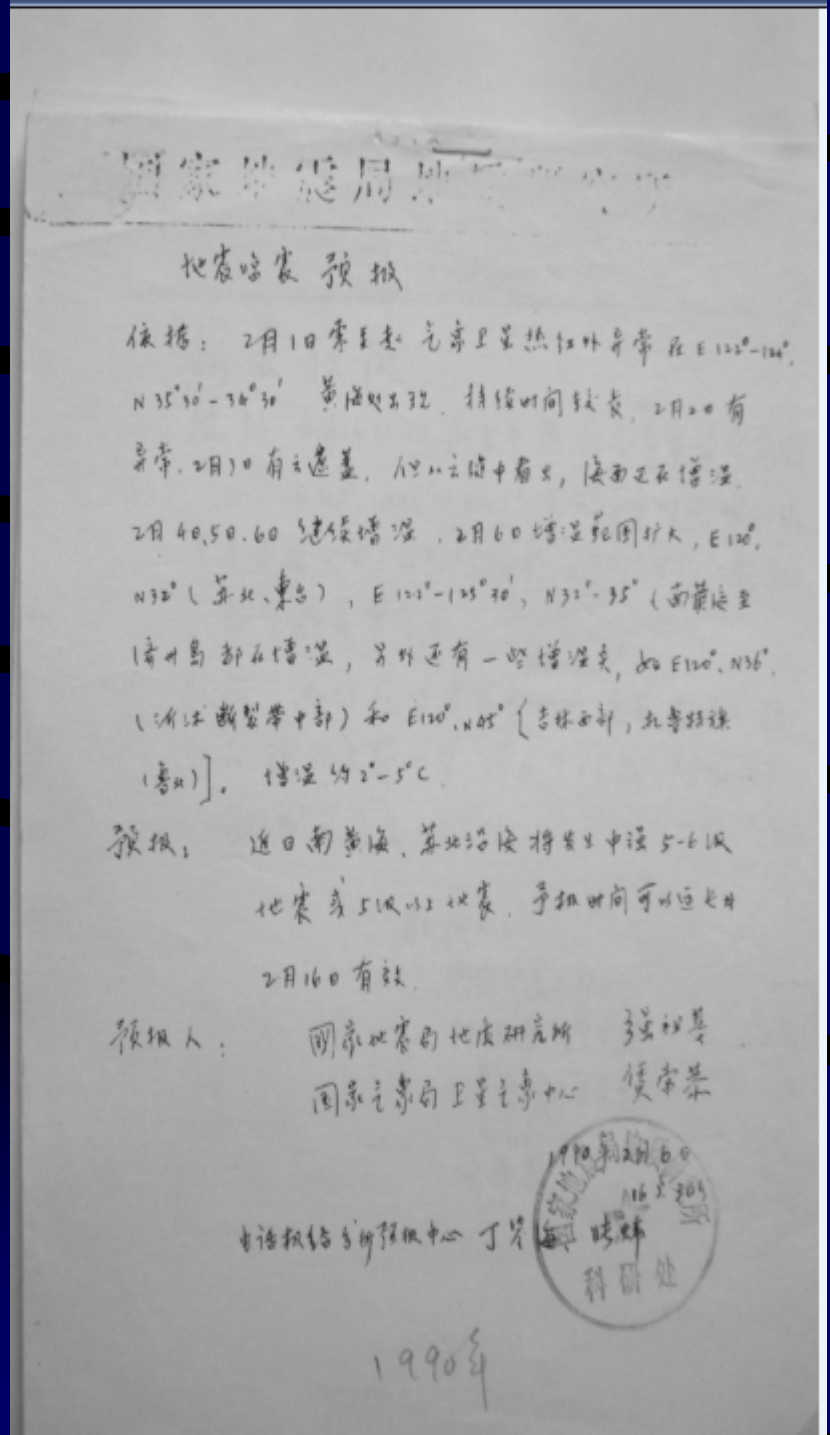


Changshou Earthquake M5.1

- Feb.10,1990 31.6°N,121°E
- Predicted time:Feb.6-Feb.21,1990
- Magnitude:5-6
- Area:31-32°N,120-121°E
- No.1


80 Z 1 5

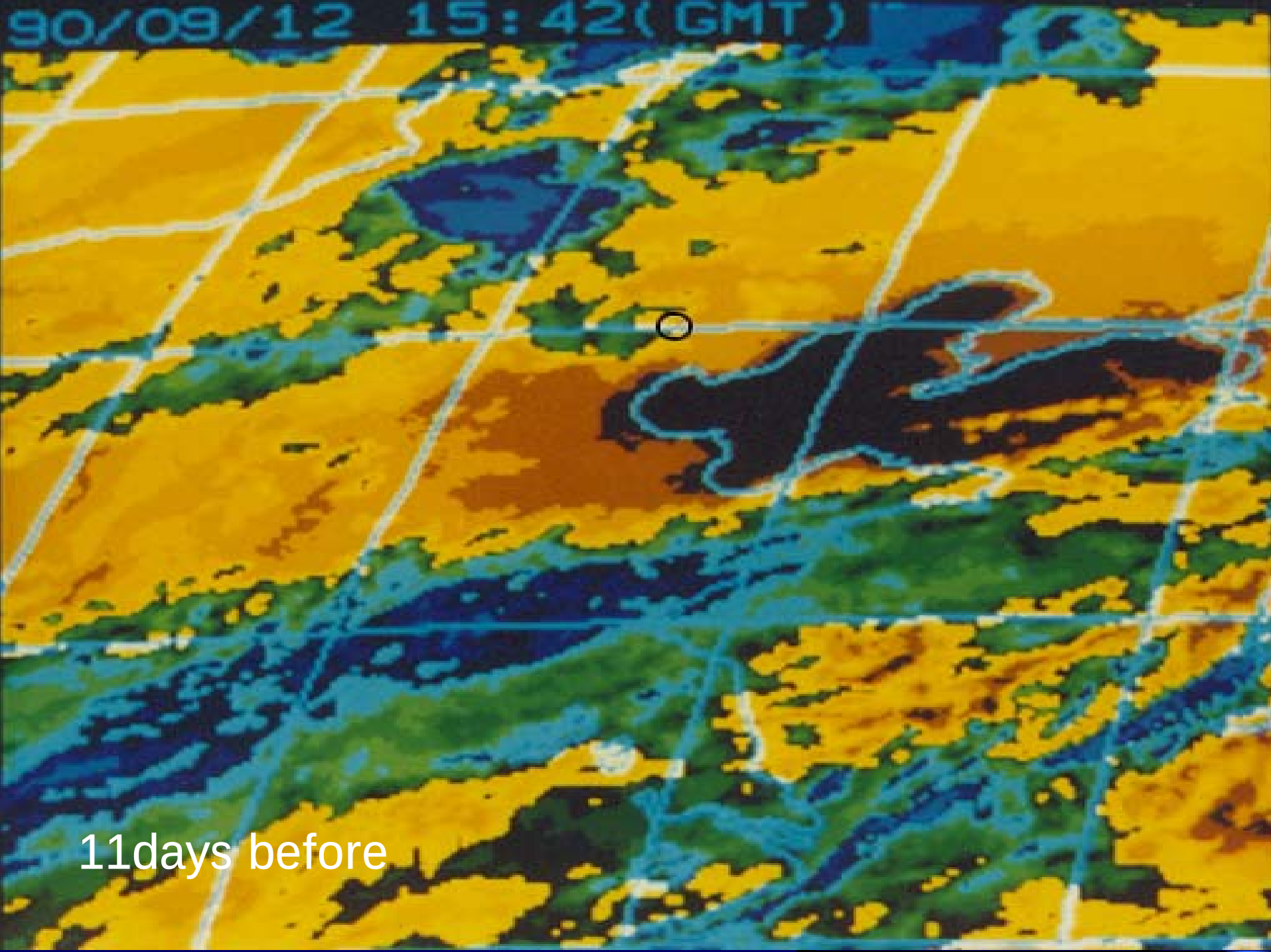

38
36
34
90.2.6.5:54
32

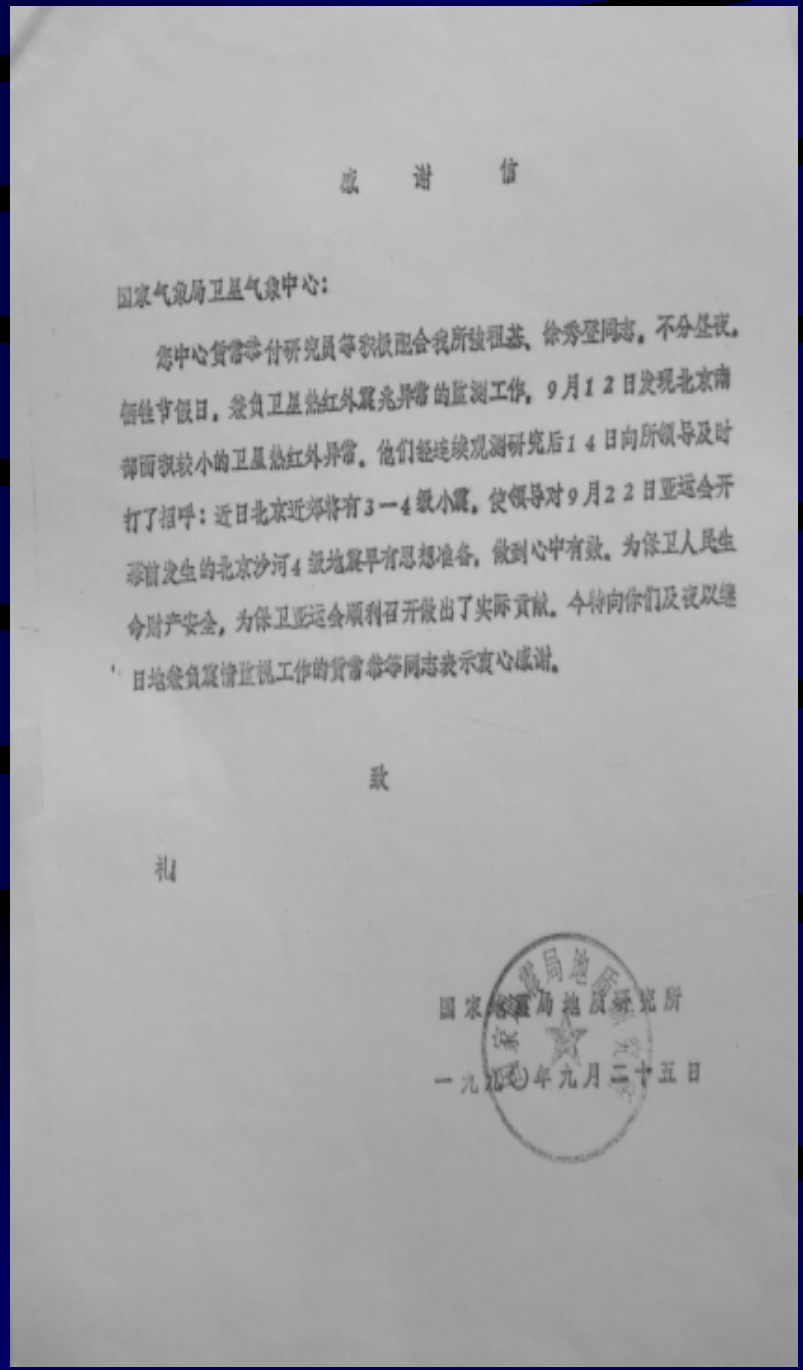


Earthquake Predicted Card
Time：Feb.6-Feb.21，1990
Area：31-32°N，120-121°E
Magnitude：5-6

Shahe Earthquake M4.0

- Sept。22，1990 Northern part of Beijing


90/09/12 15:42(GMT)
11days before



感　谢　信

国家气象局卫星气象中心：

您中心贺常恭付研究员等积极配合我所強祖基、徐秀登同志，不分昼夜，牺牲节假日，兼负卫星热红外震兆异常的监测工作，9月12日发现北京南部面积较小的卫星热红外异常。他们轻连续观测研究后14日向所领导及时打了招呼：近日北京近郊将有3—4级小震，使领导对9月22日亚运会开幕前发生的北京沙河4级地震早有思想准备，做到心中有数。为保卫人民生命财产安全，为保卫亚运会顺利召开做出了实际贡献。今特向你们及夜以继日地兼负震情监视工作的贺常恭等同志表示衷心感谢。

致

礼

国家地震局地质研究所

一九九〇年九月二十五日

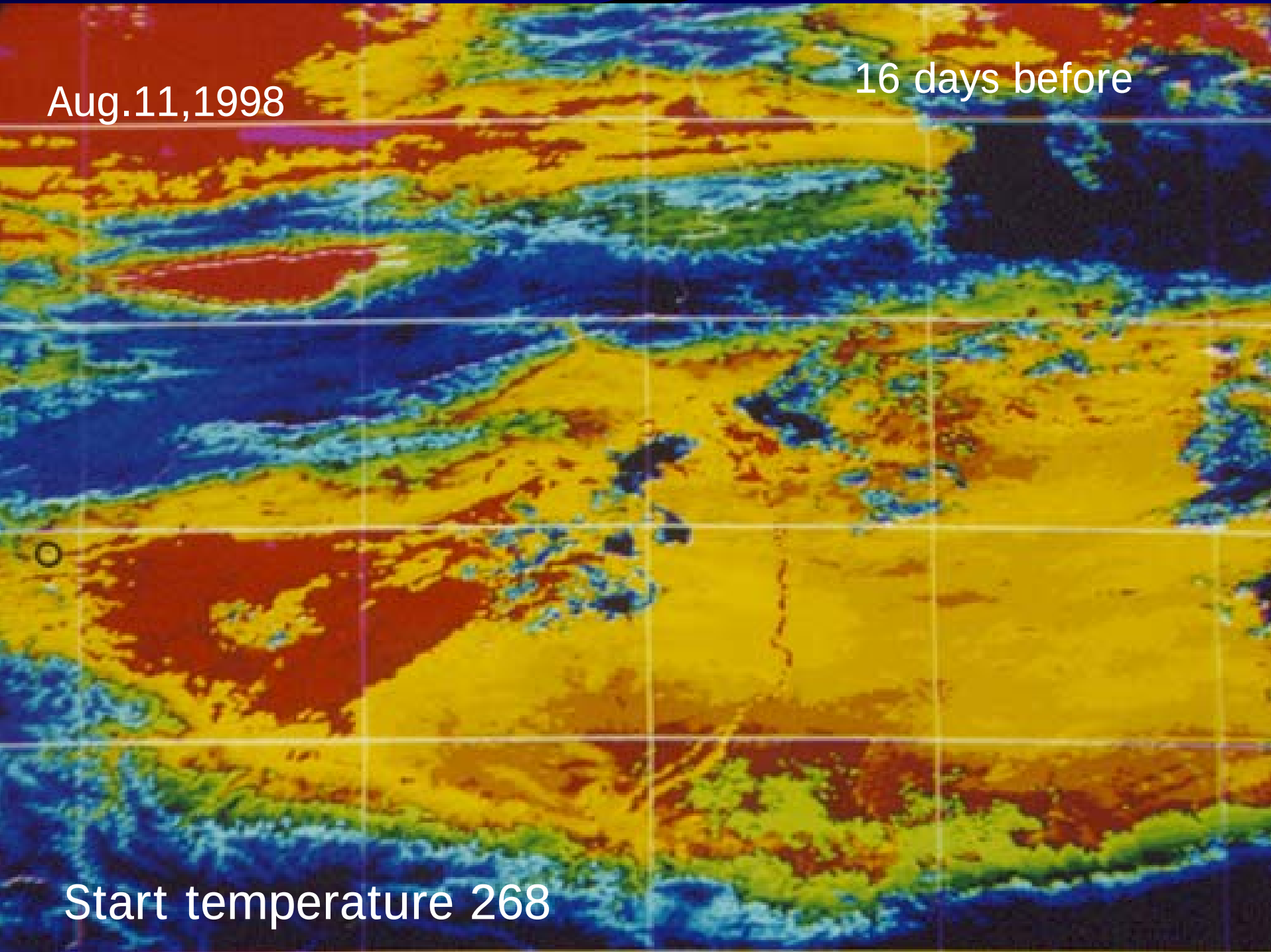
Certificate of Prediction Accuracy
Issued by Institute of Geology, CEA

Shahe Earthquake M4.0

- Predicted time:Sept.14-Sept.25,1990
- Area: Northern Suburbs of Beijing
- Magnitude:4±

Jiashi Earthquake M6.6

- August 27,1998; 39.9°N,77.9°E
- Predicted time: August 14-Sept.5
- Magnitude:6.0
- Location:39-40°N,77-78°E
- No.59

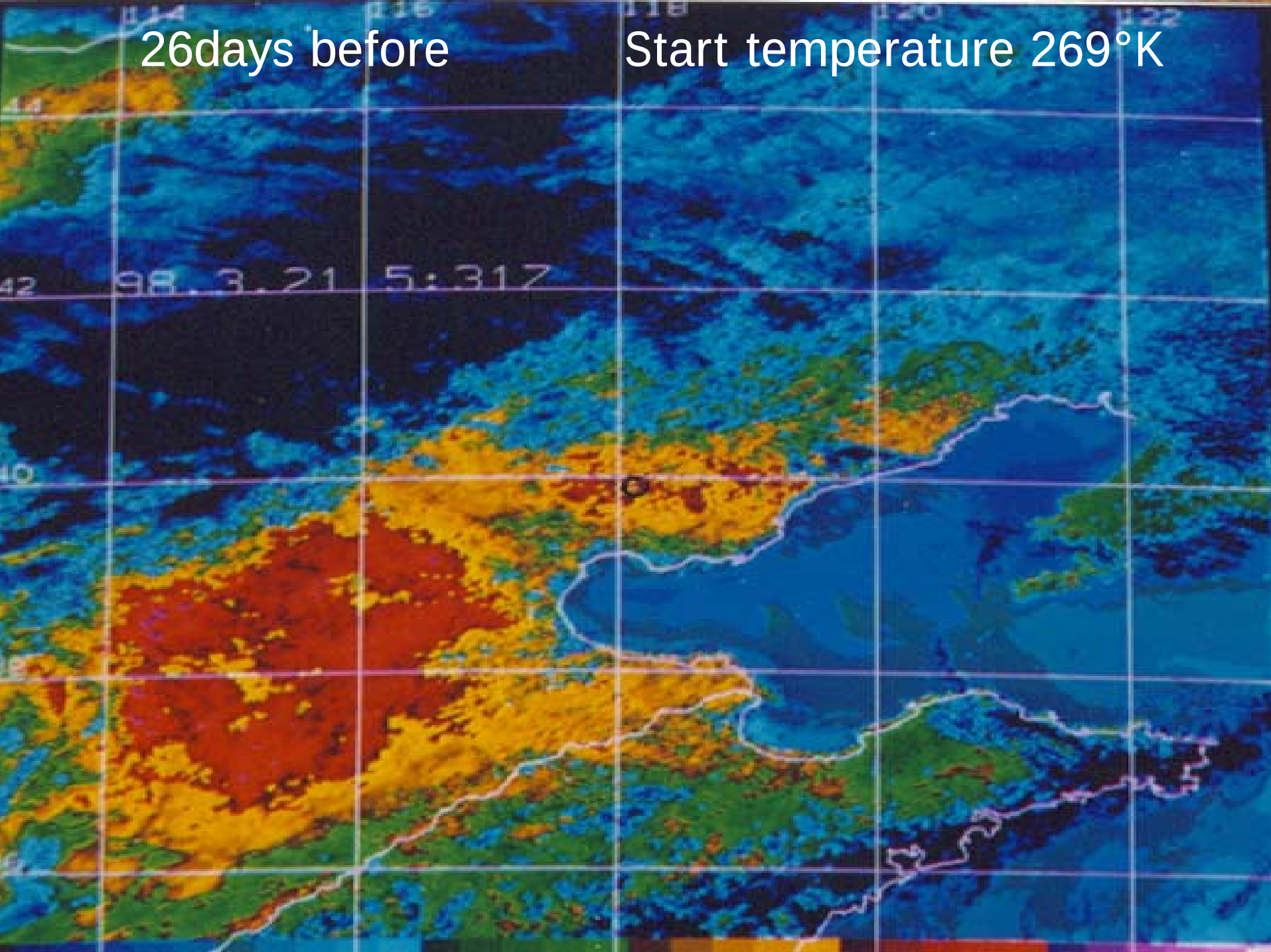

Aug.11,1998
16 days before
Start temperature 268

Slide 99

zz2	qzj, 6/9/2007
zz6	qzj, 6/9/2007

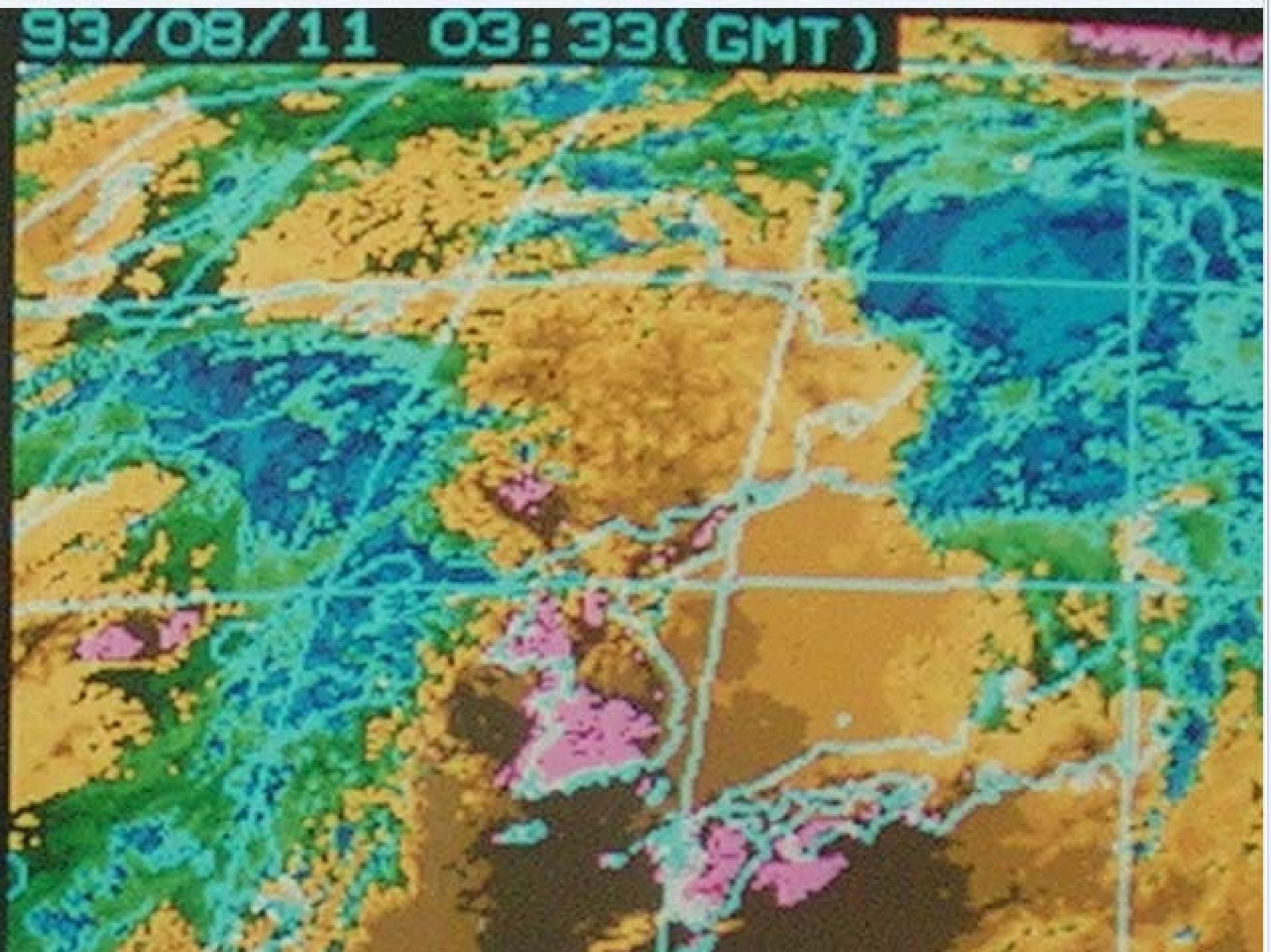
Tanshang Earthquake M4.7

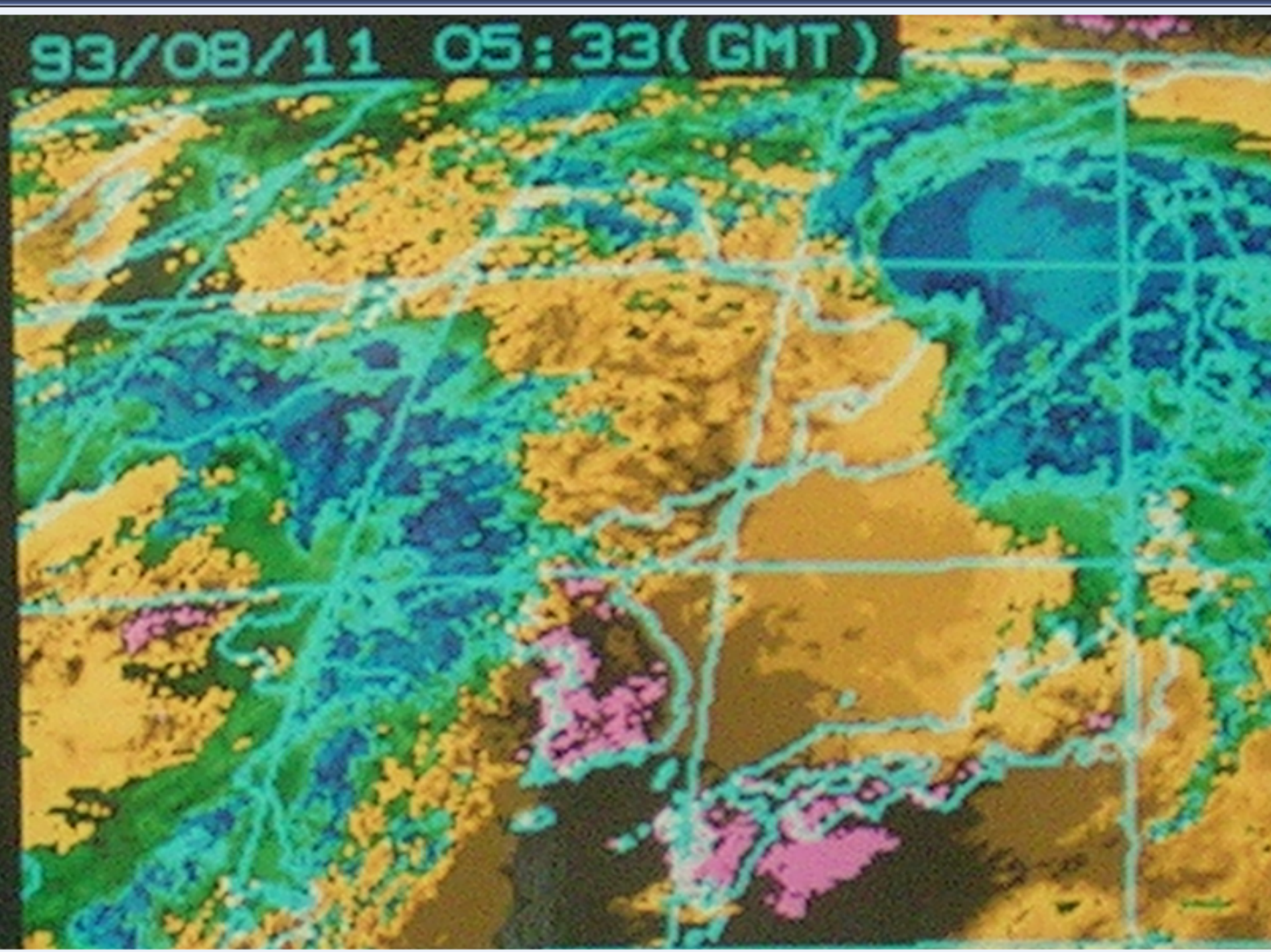
- April 14,1998 39.7°N,118.3°E
- Predicted time March 30,16 days before
- Magnitude:5.0
- Location:39-40°N,118-119°E
- No.49

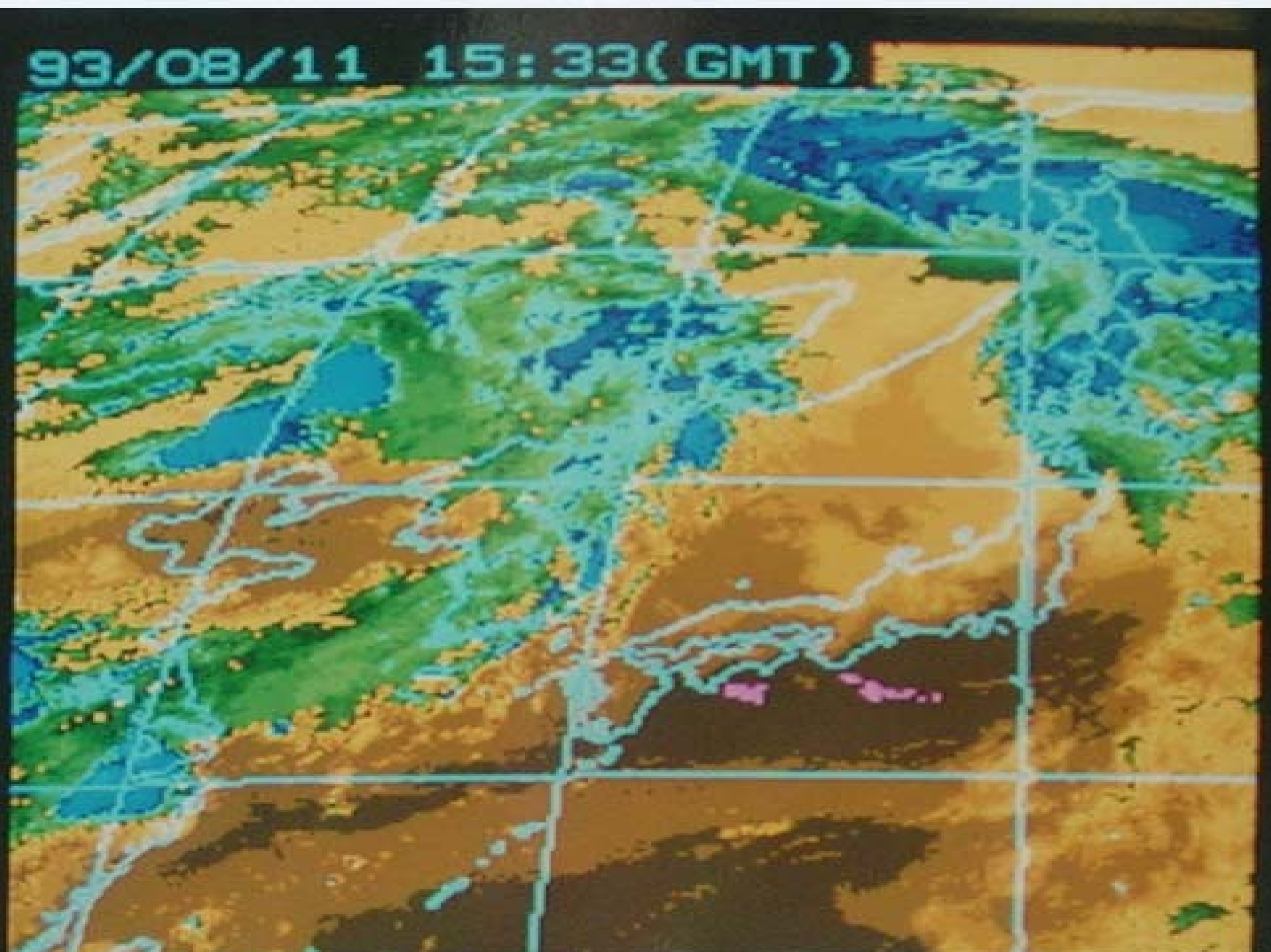

26days before
Start temperature 269°K
98.3.21 5:317

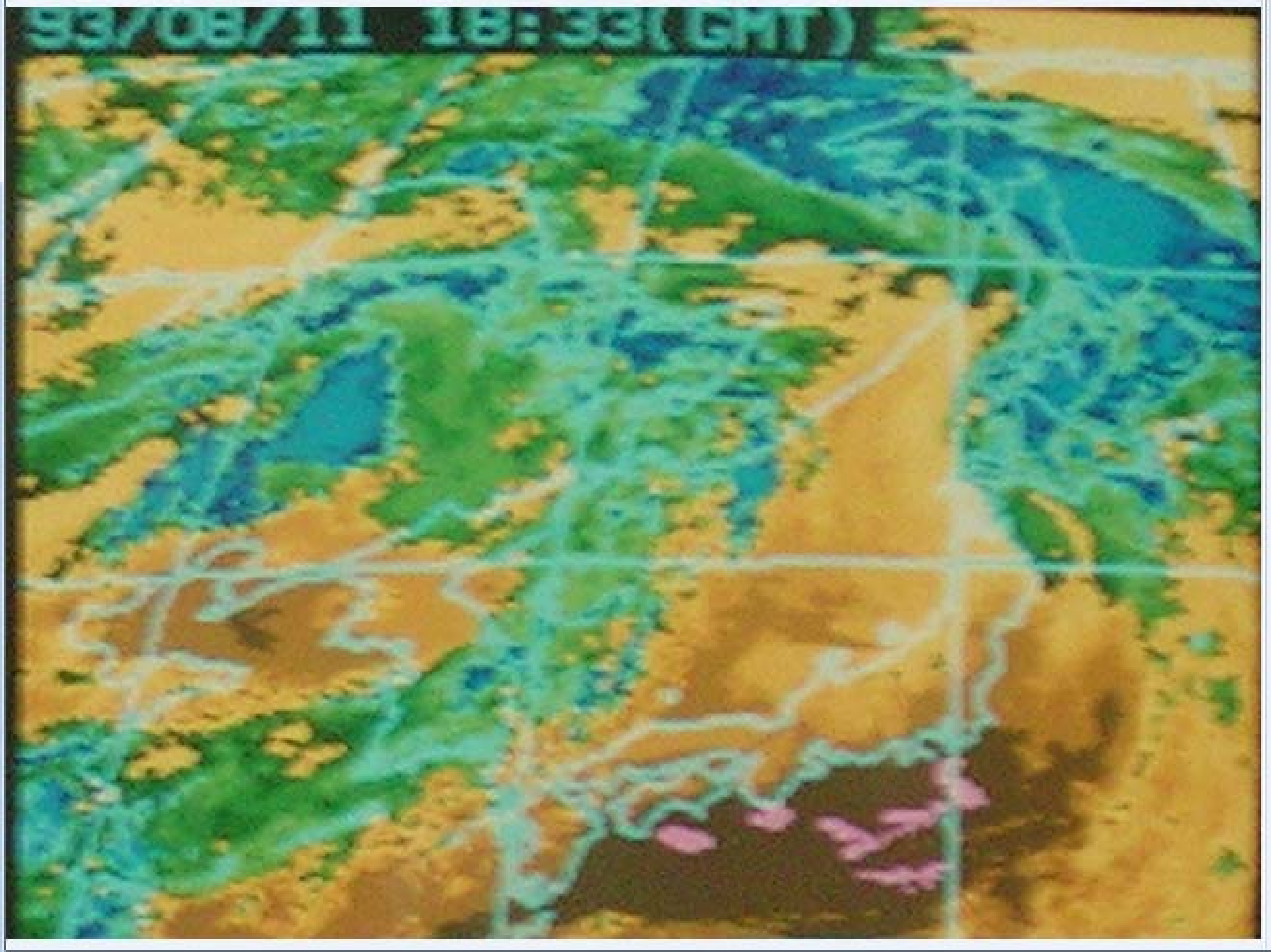
Hachijojima Isl.Earthquake M6.1Japan

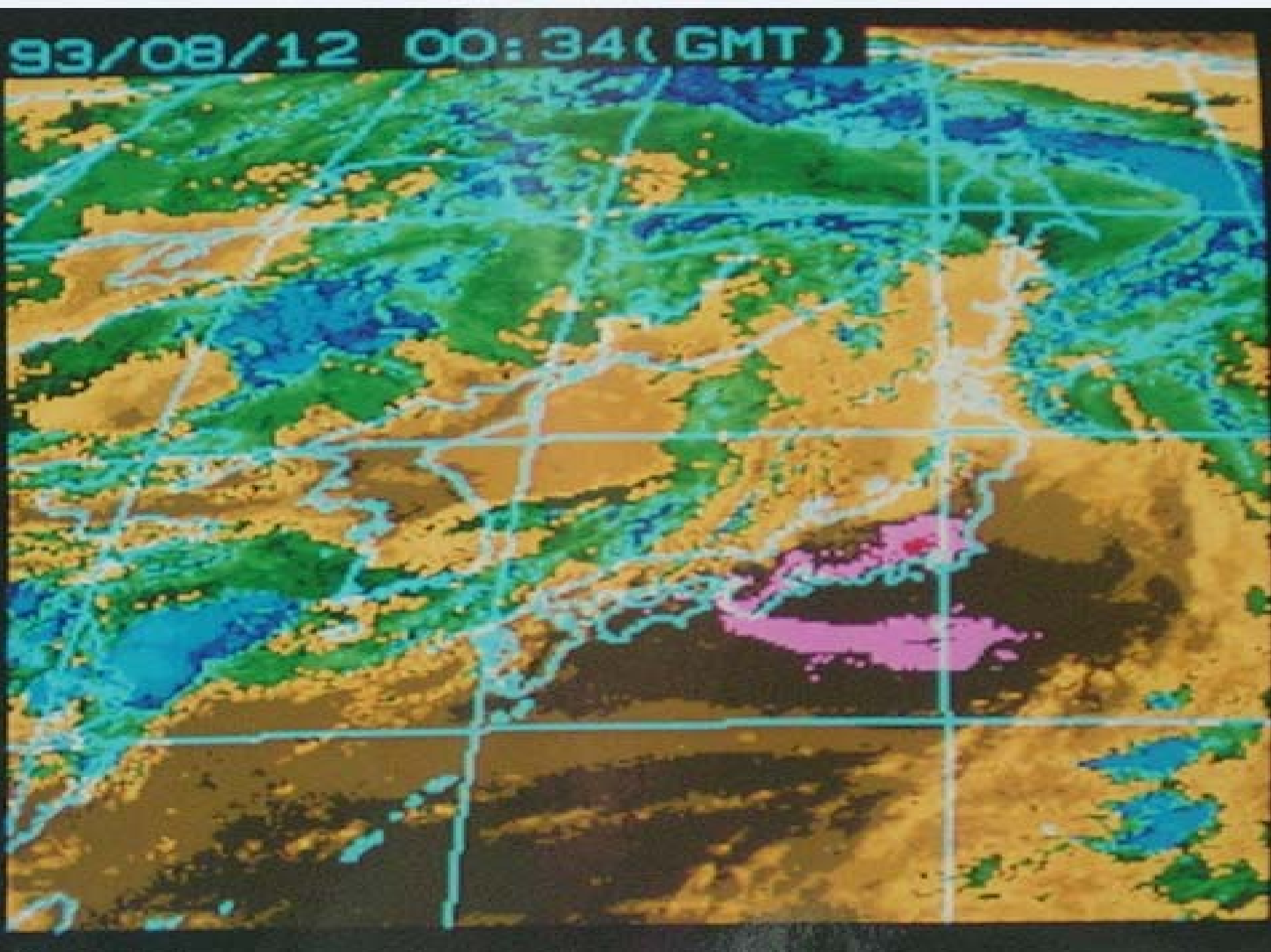
- Sept.1,1993 31.5°N,142.2°E
- Predicted time: Aug.12-Sept.5,1993
- Location:32-34°N,140-142°E
- Magnitude:6.0-6.5
- No.20

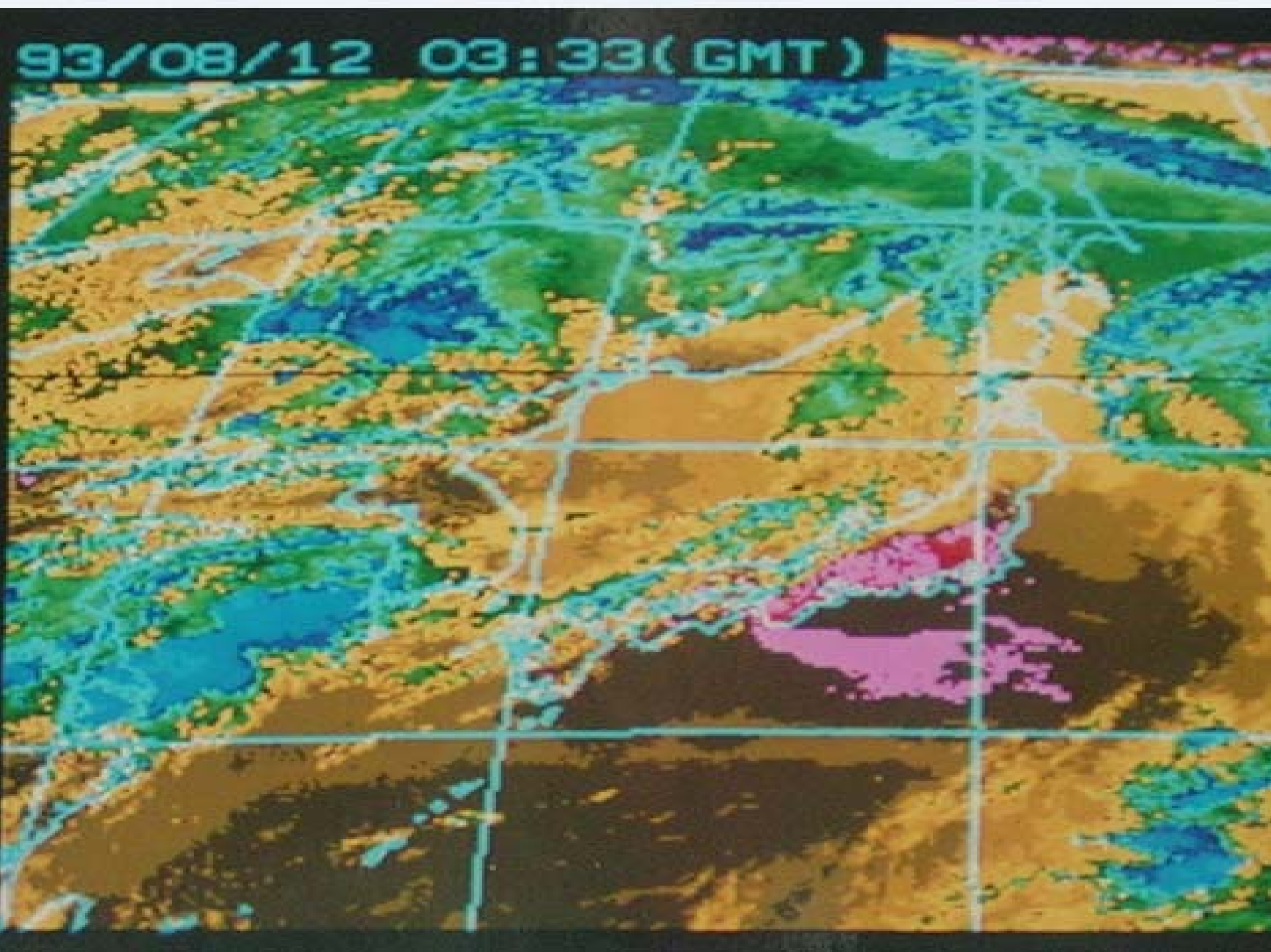

93/08/11 03:33(GMT)

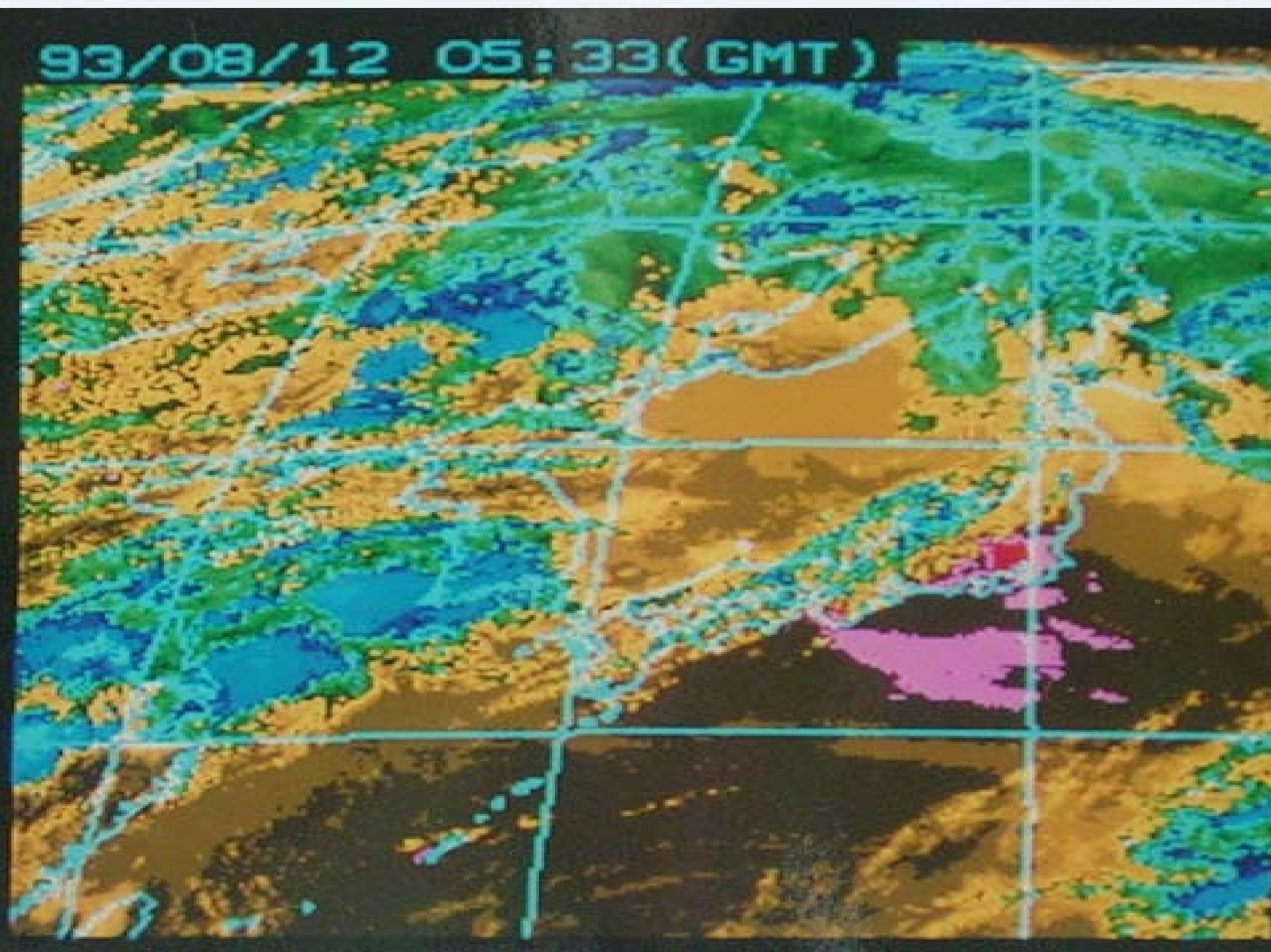

93/08/11 05:33(GMT)

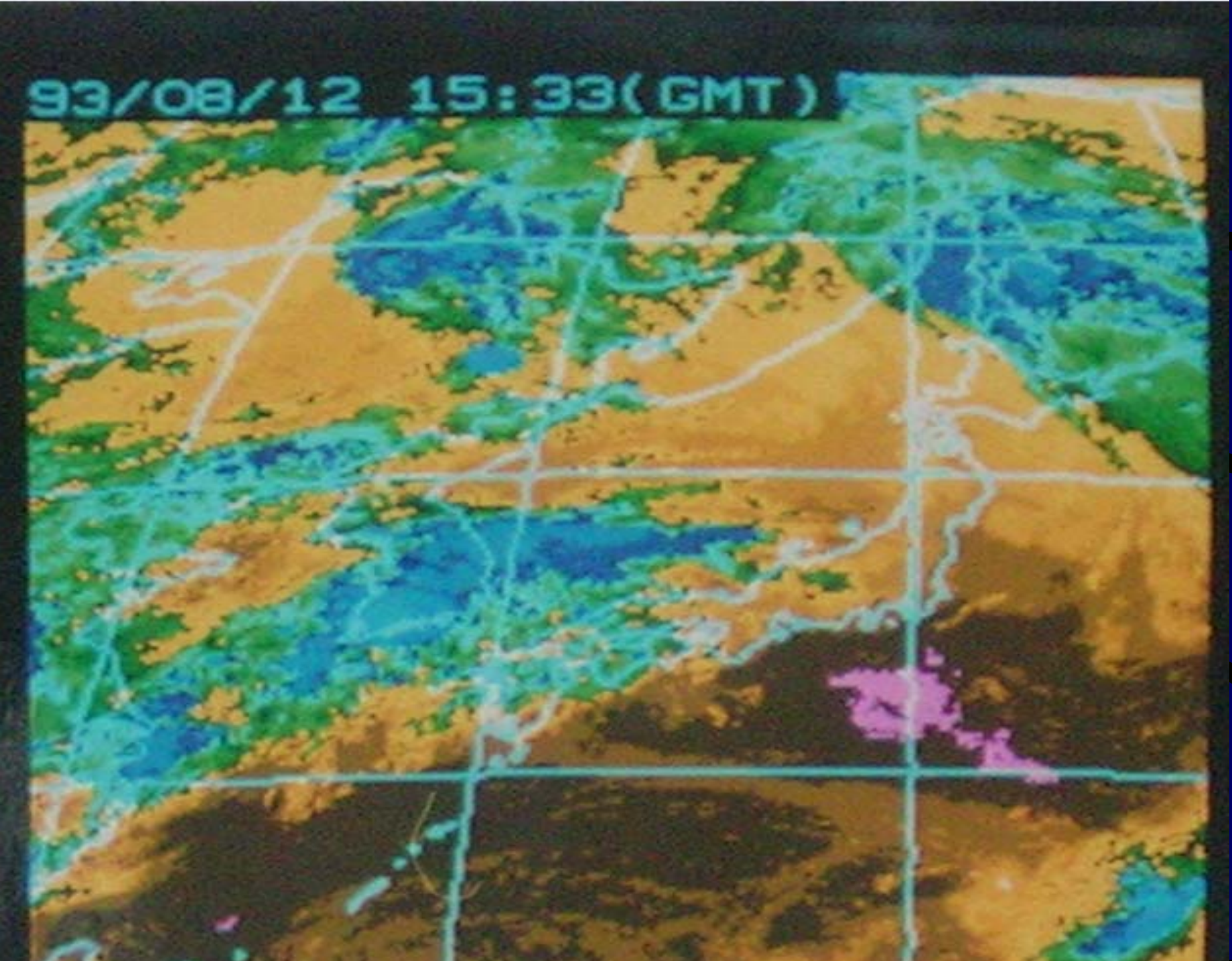

93/08/11 15:33(GMT)

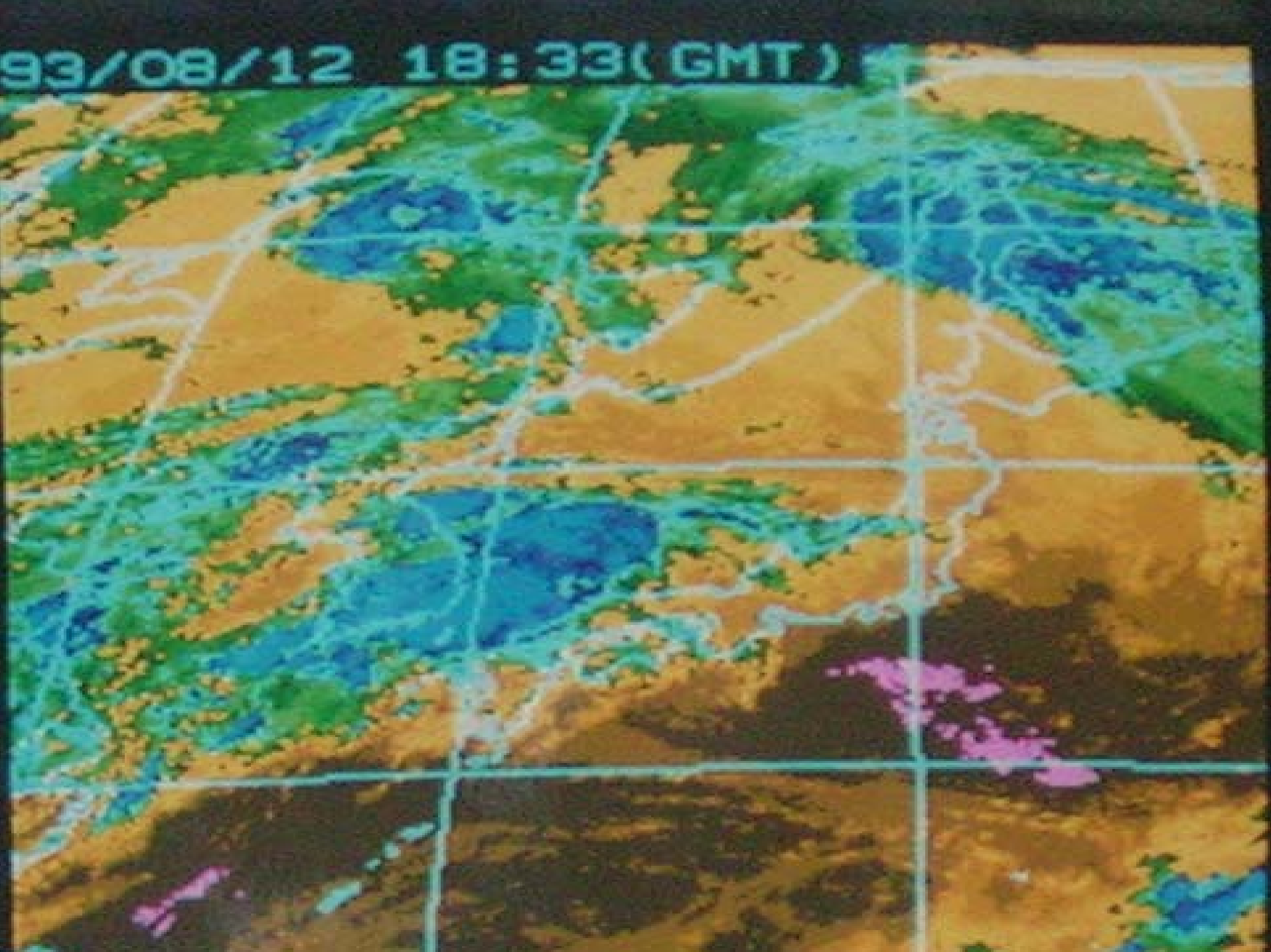

93/08/11 18:33(GMT)


93/08/12 00:34(GMT)


93/08/12 03:33(GMT)

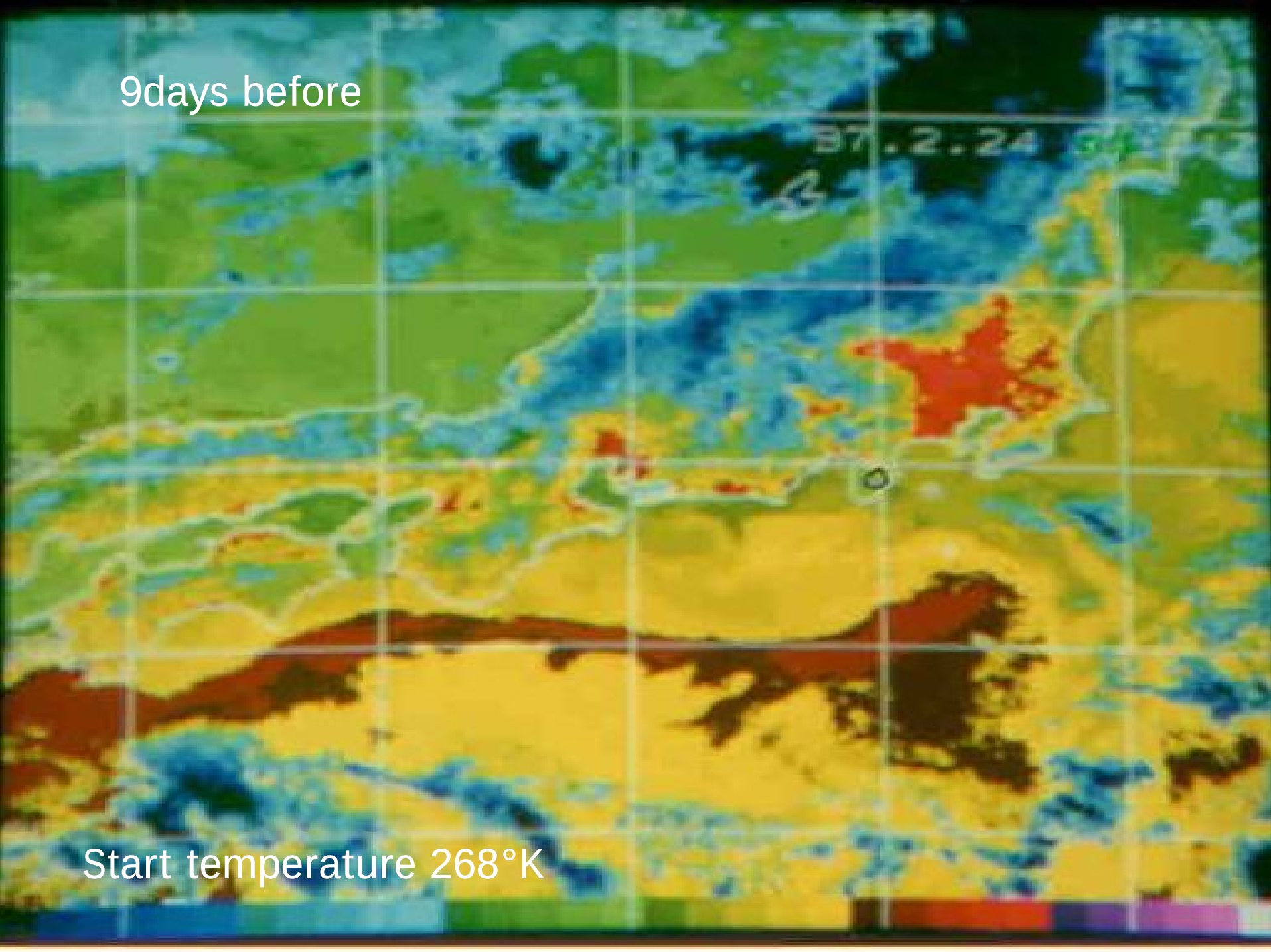

93/08/12 05:33(GMT)

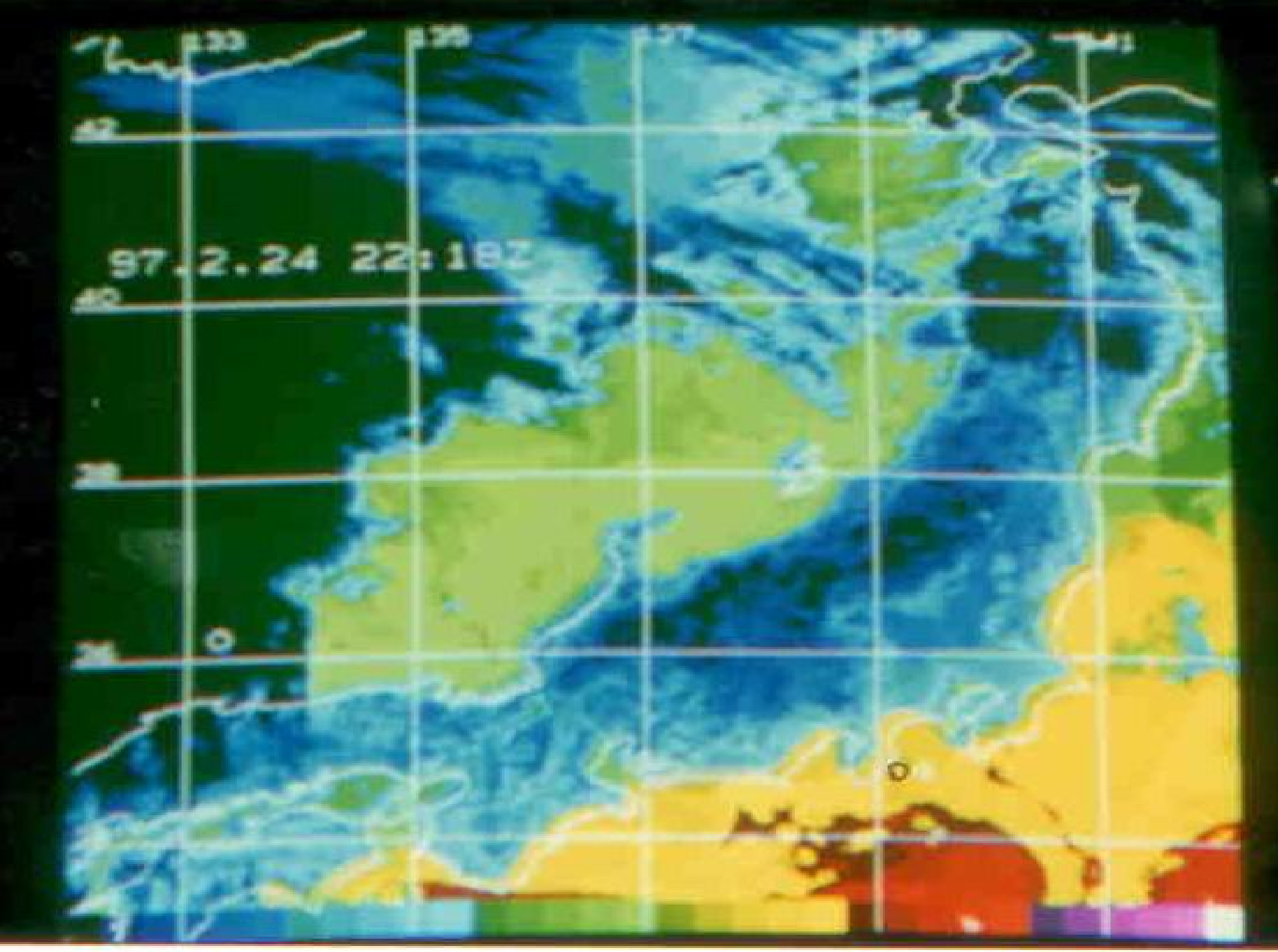

93/08/12 15:33(GMT)


93/08/12 18:33(GMT)

Izu Peninsula，swarm earthquake M5.2、5.7,Japan

- March 3、4--April 10,1997,35.5°N,130.04°E
- Predicted time:Feb.26-March 10,1997
- Area：35-36°N，139-140°E
- Magnitude：6.0
- No。38


9days before
Start temperature 268°K


97.2.24 22:18Z

北京青年报

BEIJING YOUTH DAILY

日报 今日共8版 ■1997年7月21日■星期一■第3223期■统一刊号：CN 11 - 0103 ■ 国外发行代号：D 1253 ■

卫星遥感技术助力

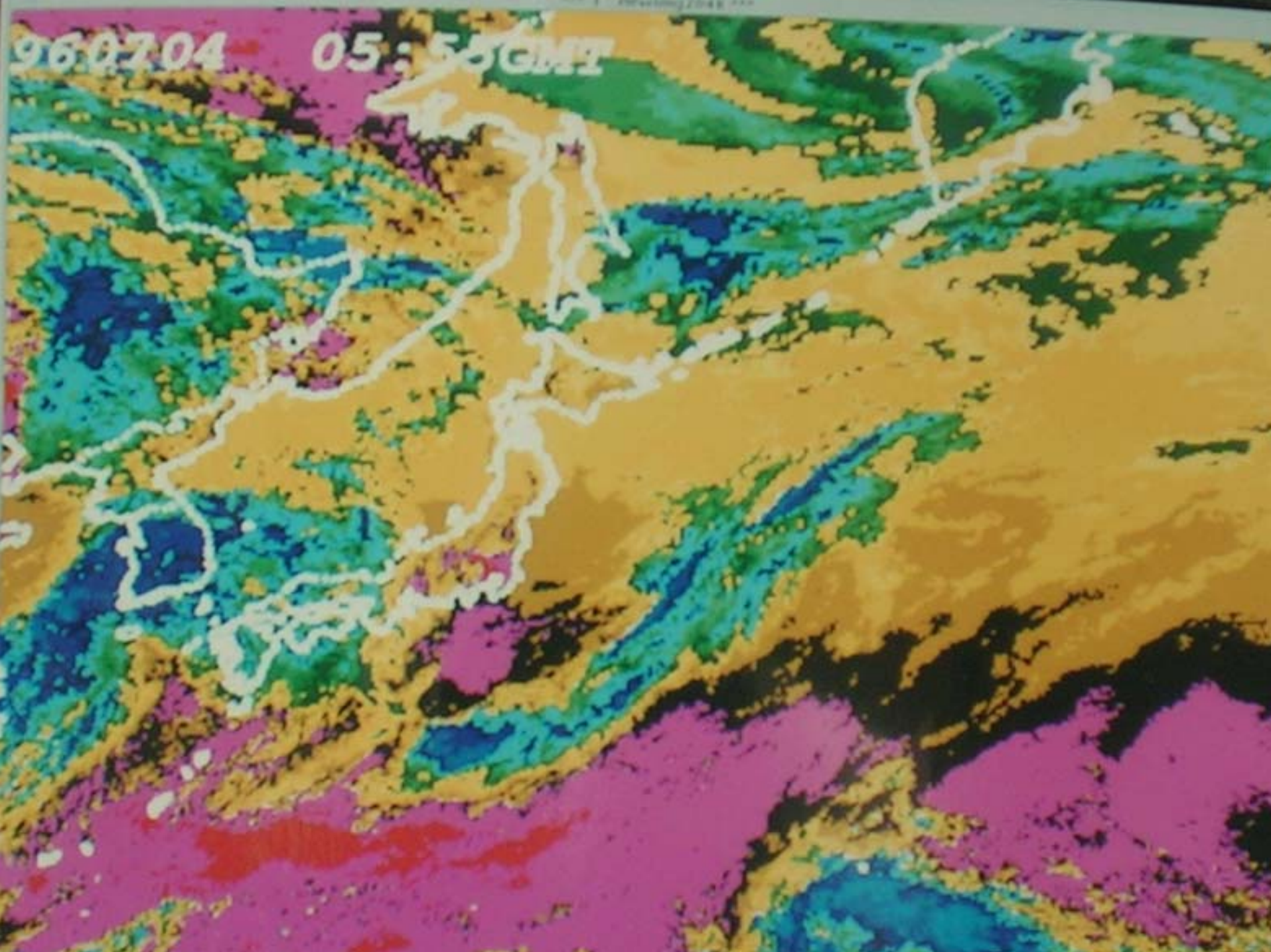
我国科学家冲击地震短临预报

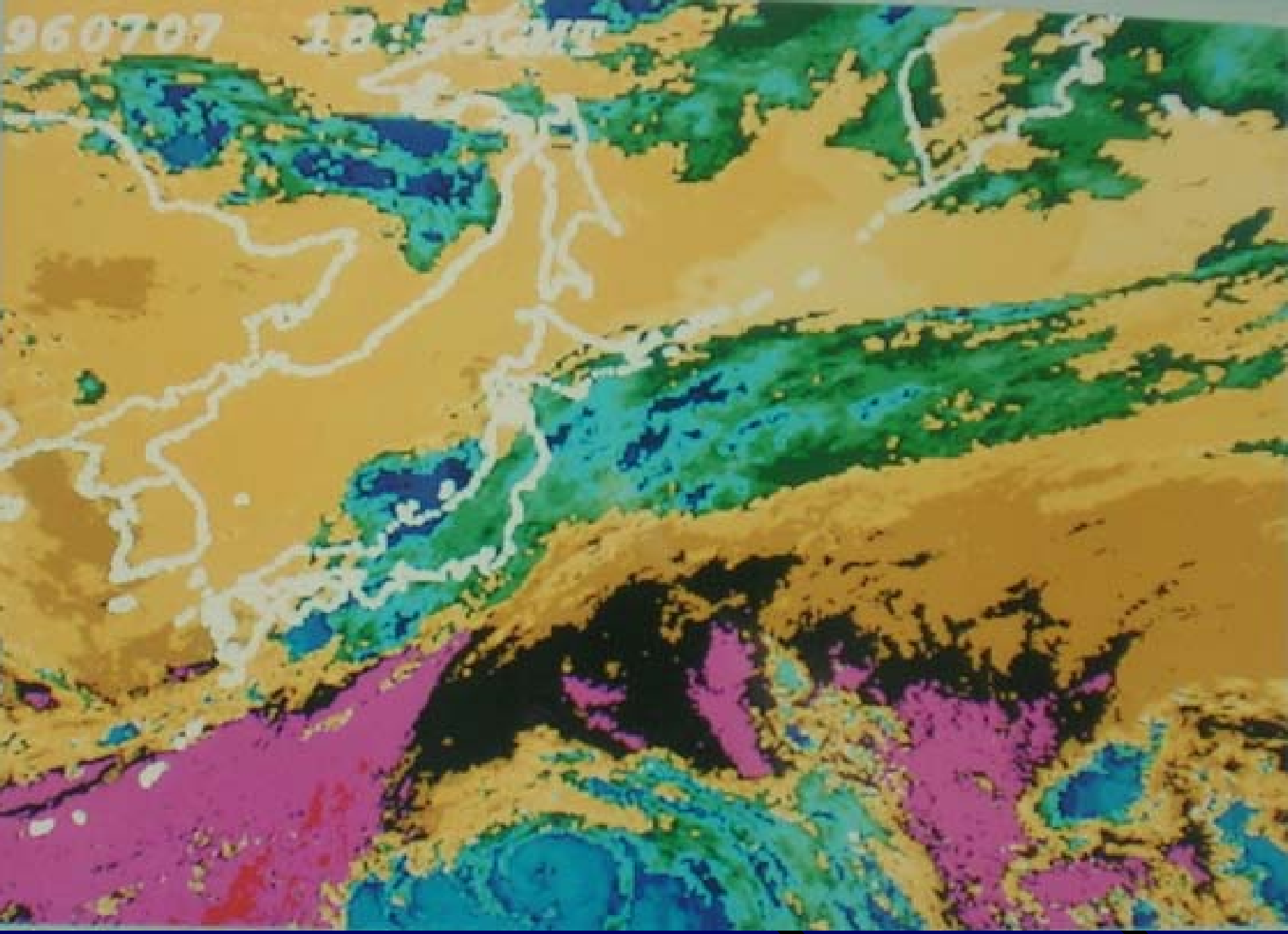
成功预报日本伊豆海域地震

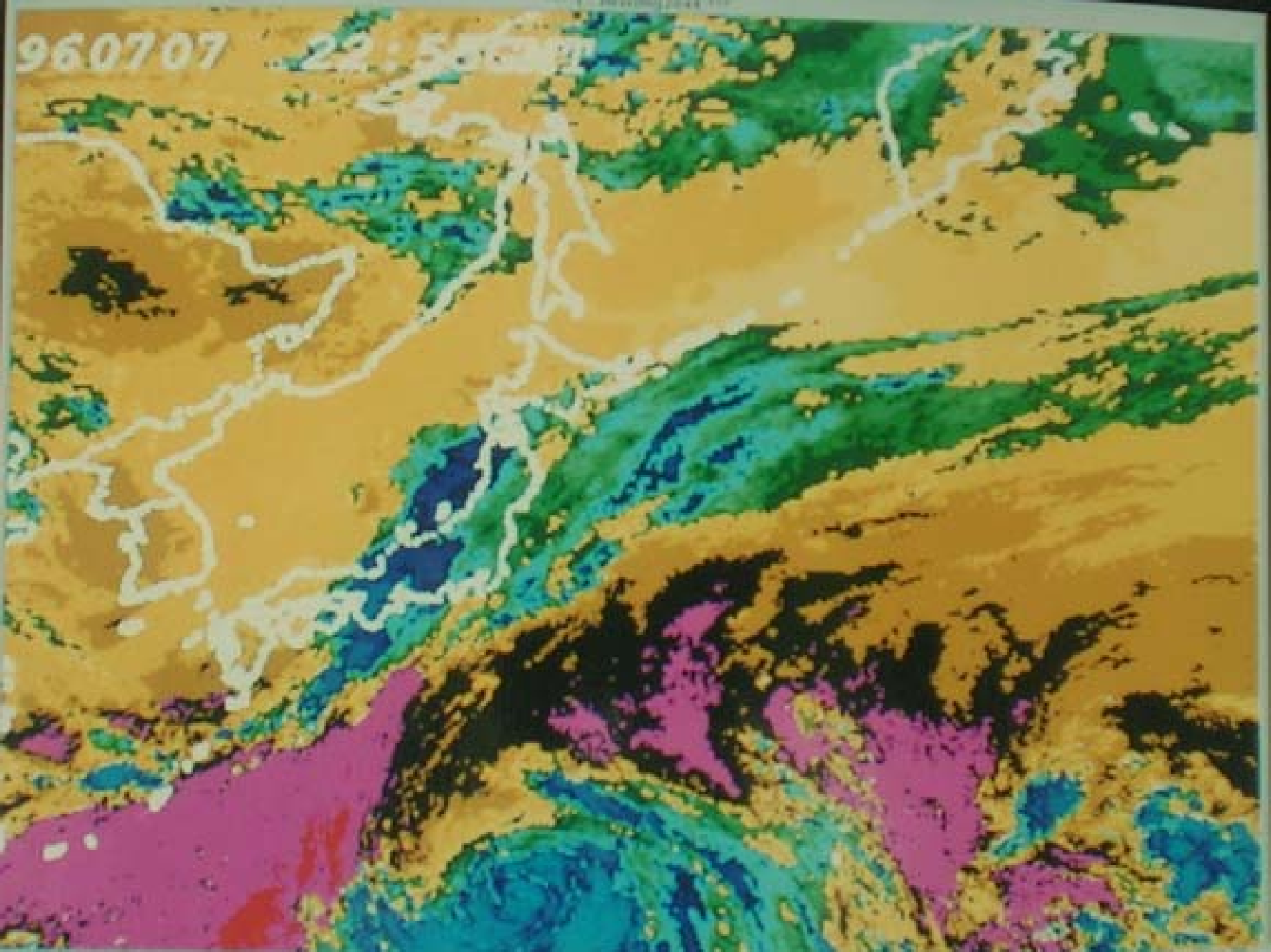
Certificate of prediction Accuracy
issued by Beijing Youth Daily July 21,1997

Kamchatka Isl.M7.4,Russia

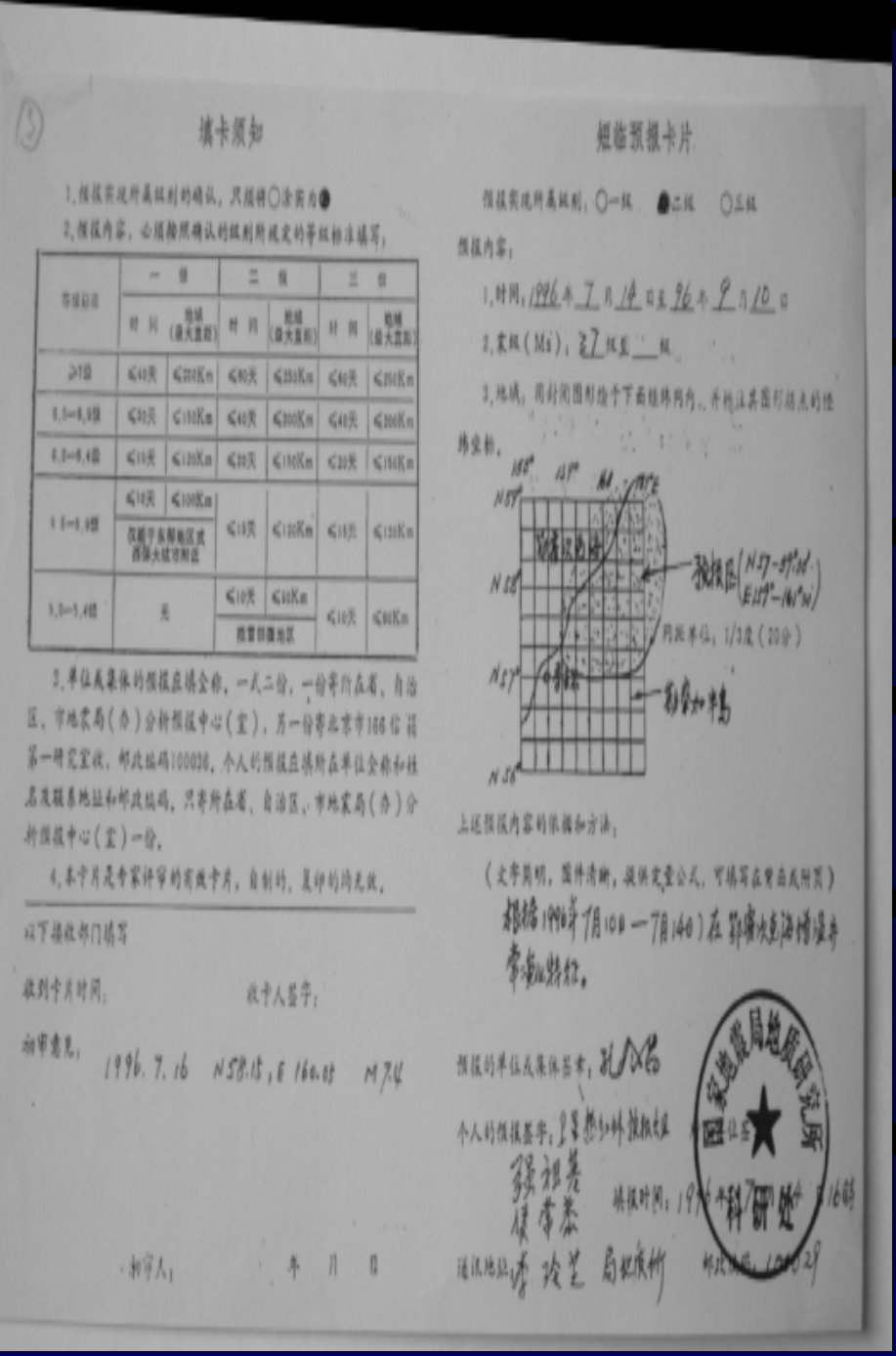
- July 16,1996 58.1°N,160.05E,
- Predicted time: July 14-Aug.5 ,1996
- Area：57-59°N，159-161°E
- Magnitude：7.0
- No。33


960704 05:55GMT




960707

Earthquake Predicted Card



填卡须知

1. 预报实现所属级别的确认，只填待○中实为●

2. 预报内容，必须按照确认的级别所规定的等级标准填写，

预报级别	一级		二级		三级	
	时间	地域（最大直径）	时间	地域（最大直径）	时间	地域（最大直径）
≥7级	≤40天	≤200Km	≤60天	≤350Km	≤80天	≤500Km
6.5～6.9级	≤30天	≤150Km	≤45天	≤300Km	≤60天	≤400Km
6.0～6.4级	≤15天	≤120Km	≤20天	≤150Km	≤30天	≤200Km
5.0～5.9级	≤10天	≤100Km	≤15天	≤120Km	≤15天	≤120Km
	仅限于东部地区或西部大城市附近					
5.0～5.4级	无		≤10天	≤60Km	≤10天	≤80Km
			仅限东部地区			

3. 单位或集体的预报应填全称，一式二份，一份寄所在省、自治区、市地震局（办）分析预报中心（室），另一份寄北京市100位信箱第一研究室收，邮政编码100036，个人的预报应填所在单位全称和社员及联系地址和邮政编码，只寄所在省、自治区、市地震局（办）分析预报中心（室）一份。

4. 本卡片是专家评审的有效卡片，自制的、复印的均无效。

以下接收部门填写

收到卡片时间：　　收卡人签字：

初审意见：1996.7.16 N58.1°, E166.8°　M7.4

初审人：　　年　月　日

短临预报卡片

预报实现所属级别：○一级　●二级　○三级

预报内容：

1. 时间：1996年7月16日至96年9月10日

2. 震级（M）：≥7级至＿级

3. 地域：用附图形给个下面经纬网内，并标注其图形特点的经纬坐标。

上述预报内容的依据和方法：

（文字简明，图件清晰，提供交叉公式，可填写在背面或附页）

根据1996年7月10日—7月14日在环太平洋火山活动带发生强烈群震。

预报的单位或集体签字：

个人的预报签字：

预报时间：1996年7月16日

通讯地址：

国家地震局地震研究所 科研专用

Certificate of prediction Accuracy
Issued by Director Zhengjian Guo

of the Special Committee
for
Prediction Nature Disaster
in
the Geophysical Union of China

Samal Swarm Earthquake M7.0,7.2,7.5,7.2,7.0,7.1 Philippine

- April 21,23,,May 5,1995
- Predicted time:Apr.16-May5,1995
- Area：Samal Isl。Philippine，11-13°N，126-127°E
- Magnitude：7.0
- No。29

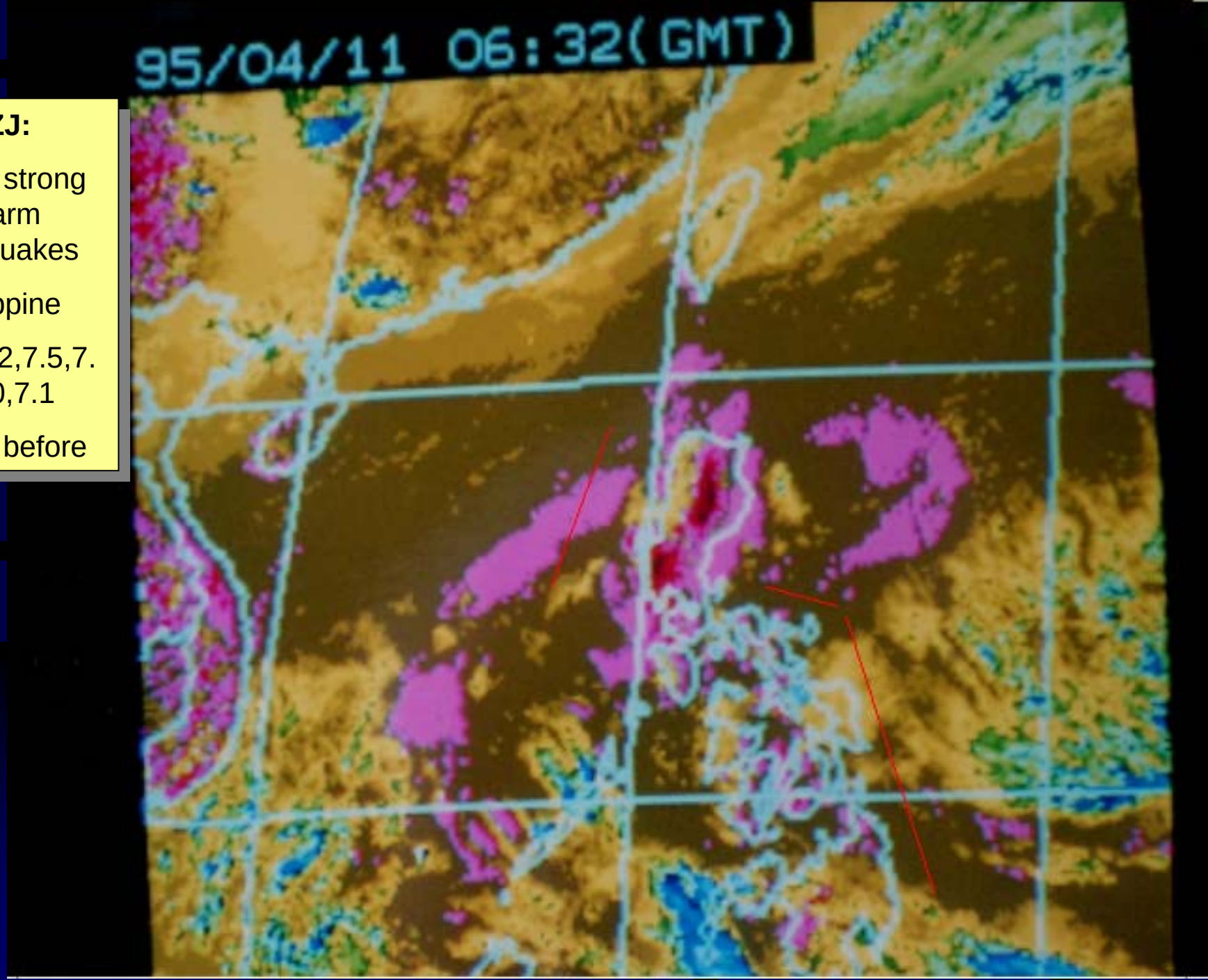
QZJ:

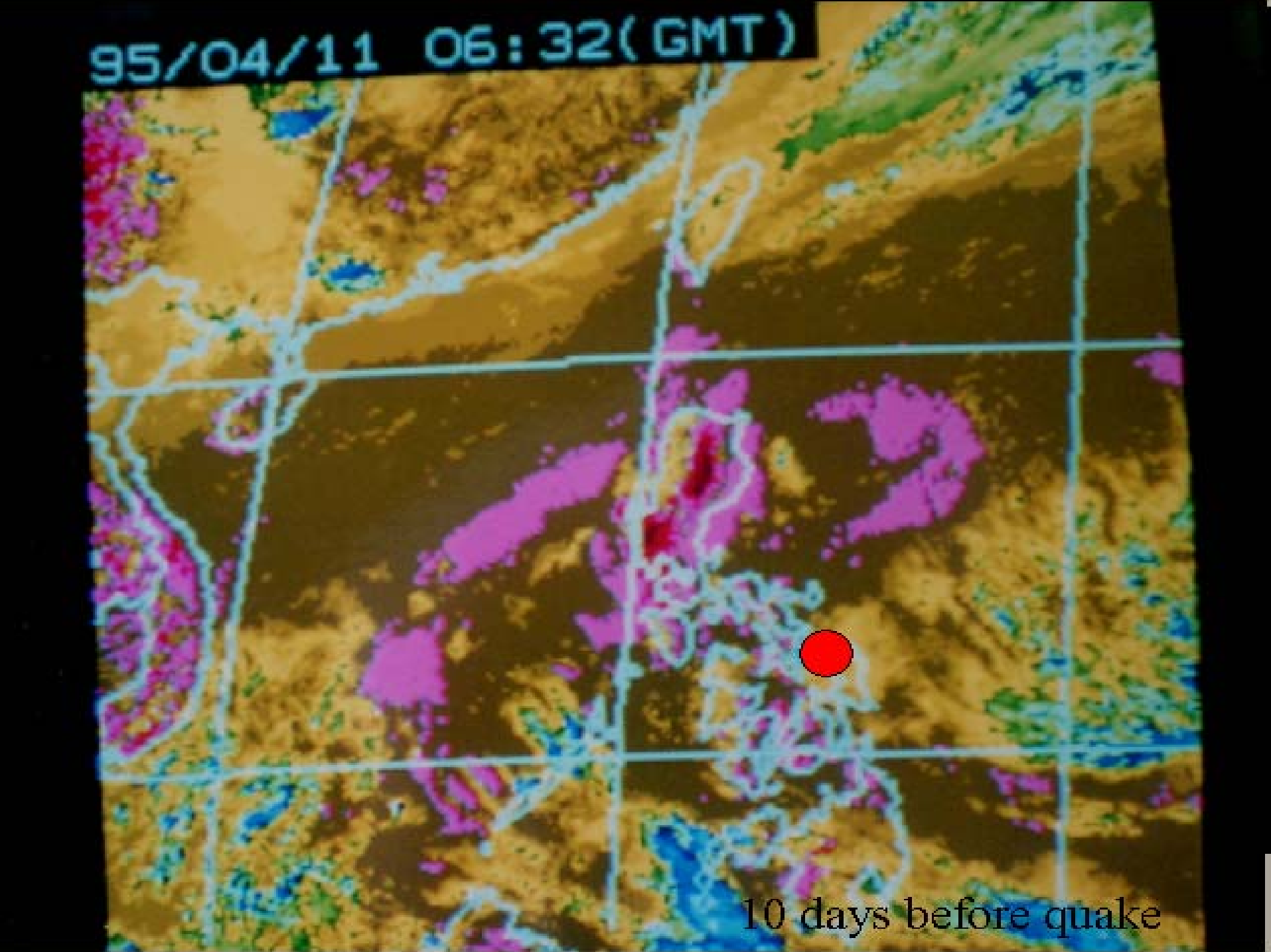
Samar strong swarm earthquakes

Philippine

M7.0,7.2,7.5,7.2,7.0,7.1

9 days before




95/04/11 06:32(GMT)
10 days before quake

95/04/12 05:31(GMT)
9 days before quake

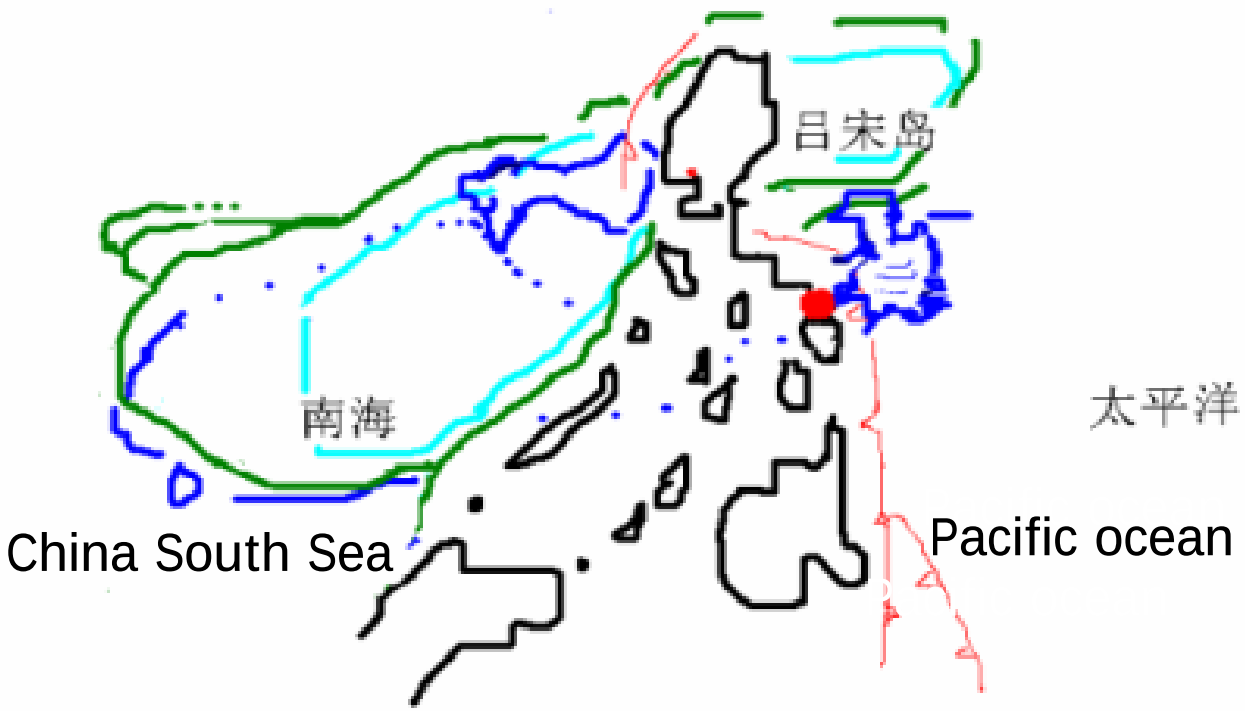
95/04/13 05:31(GMT)
8 days before quake

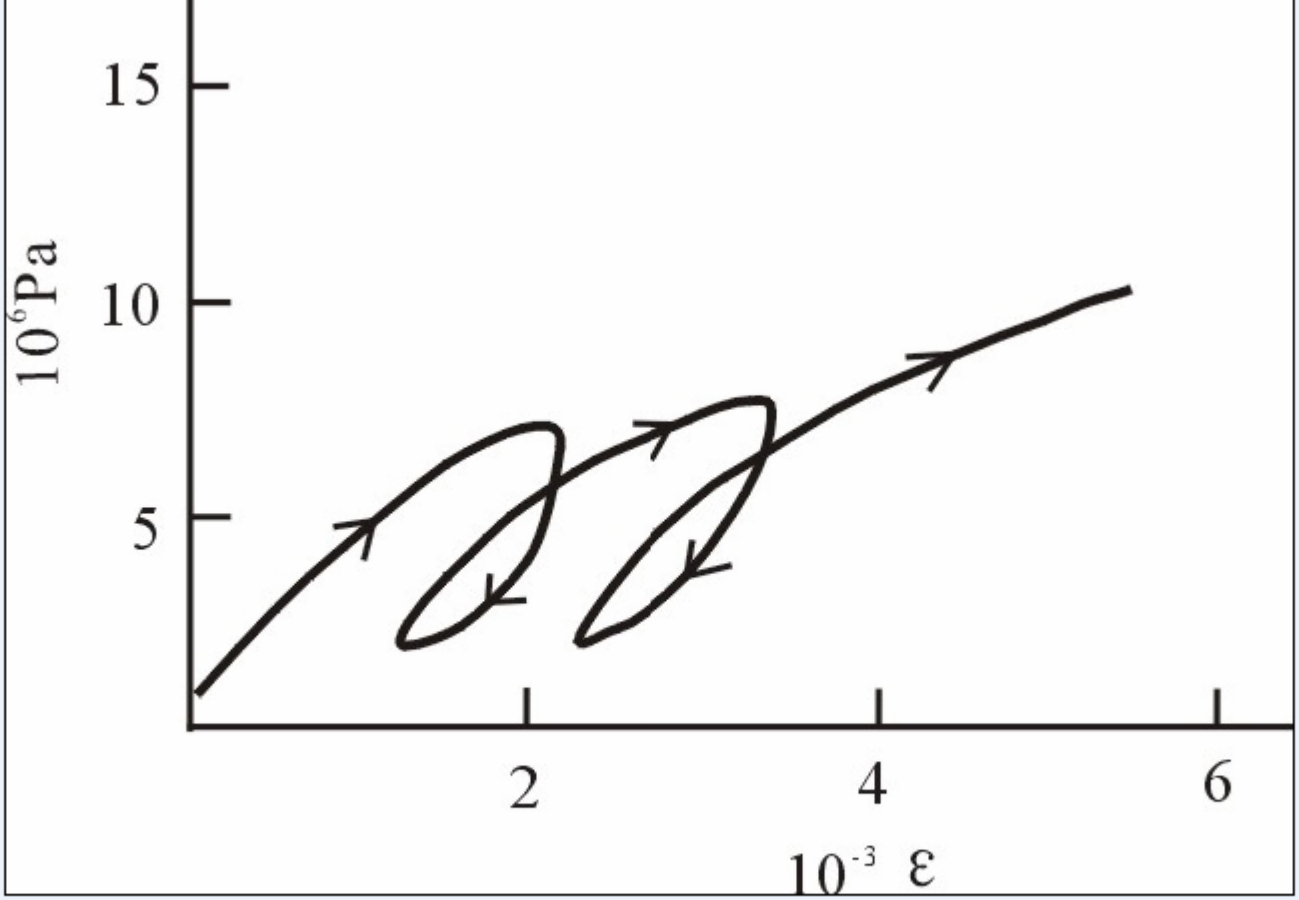
QZJ:

Green-Apr.11

Ciel-Apr.12

Blue-Apr.13





The diagram of load-unload character of quartzite under alternating tidal stress in the earth (After Wen,1983)

QZJ:21/04-05/05.

1995

菲律宾萨玛岛 M7.0,7.2,7.5,7.2,7.0,7.0

填卡须知

1. 预报实现时属级别的确认，只须将○涂实为●

2. 预报内容，必须按照确认的级别所规定的等级标准填写；

预报标准	一级		二级		三级	
	时间	地域（震大震距）	时间	地域（震大震距）	时间	地域（震大震距）
≥7级	≤6月	≤250Km	≤6月	≤250Km	≤6月	≤250Km
6.5—6.9级	≤6月	≤200Km	≤6月	≤200Km	≤6月	≤200Km
6.0—6.4级	≤3月	≤150Km	≤3月	≤150Km	≤3月	≤150Km
5.5—5.9级	≤3月	≤100Km 且属于发震地区或邻近大地震附近	≤3月	≤150Km	≤3月	≤120Km
5.0—5.4级	无		≤1月	≤50Km 极震区附近地区	≤1月	≤80Km

3. 单位或集体的预报应填全称，一式二份，一份寄所在省、自治区、市地震局（办）分析预报中心（室），另一份寄北京市100信箱第一研究室收，邮政编码100036。个人的预报应填所在单位全称和社会及预震地点和邮政编码，只寄所在省、自治区、市地震局（办）分析预报中心（室）一份。

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4. 21	11.7	126.5	7.2
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5. 5	N 12.8	125.5	7.1

年　月　日

短临预报卡片

7

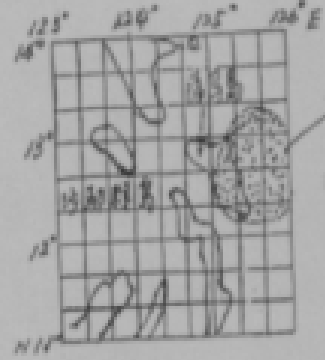
预报实现时属级别：○一级　●二级　○三级

预报内容：

1. 时间 1995 年 4 月 16 日至 95 年 5 月 5 日

2. 震级（Ms）：6.0 级至 6.9 级

3. 地域：用封闭图形给予下面经纬网内，并标注其图形特点的经纬数。



网格单位：1/3度（20分）

（N12.1°—13.3°
E125—126°）

上述预报内容的依据和方法：

（文字简明，图件清晰。提供文章公式，可填写在背面或附页）

根据4月19、20、15、16 连续4天在南海、太平洋[illegible]
群岛各自两个测震的资料结论。

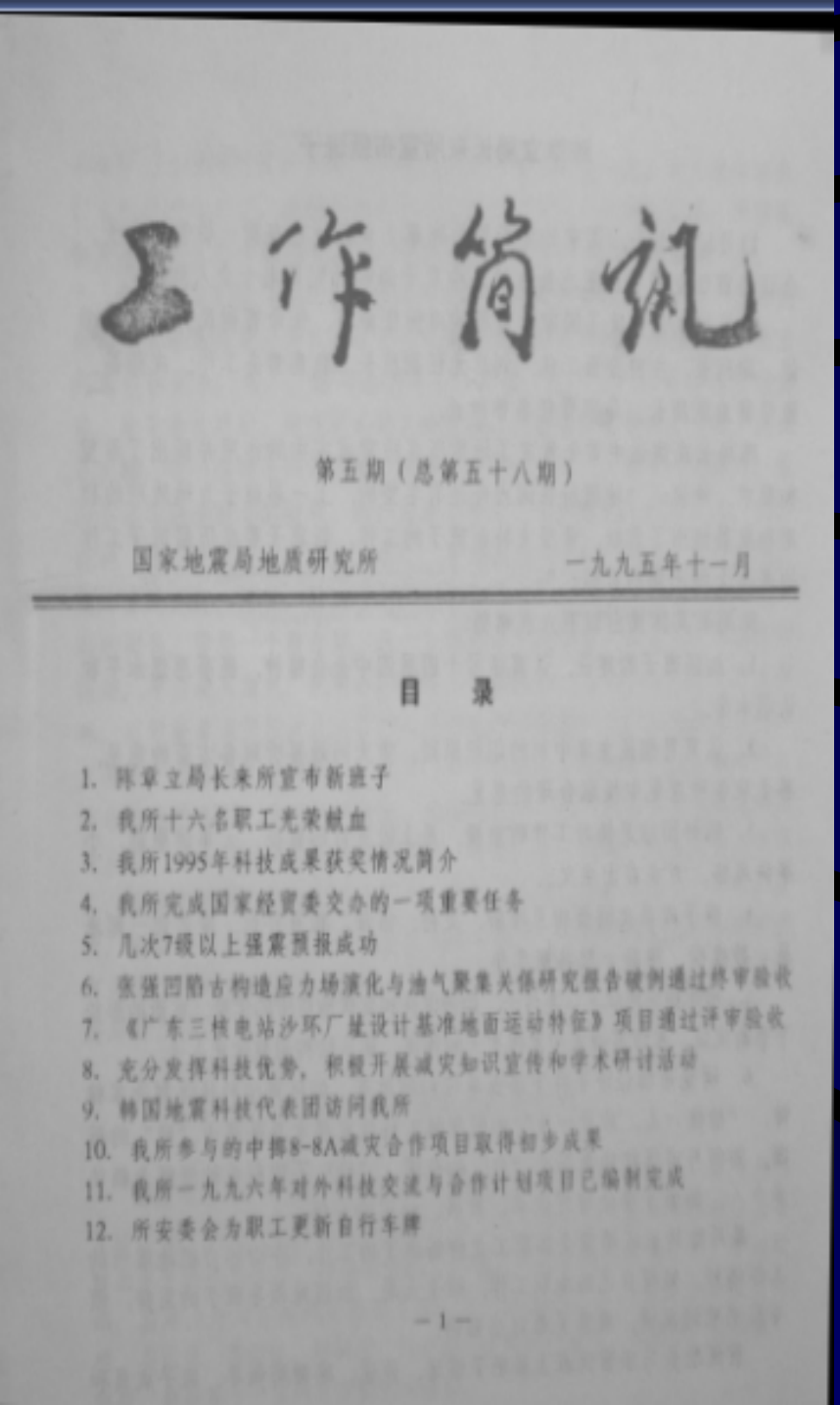
预报的单位或集体签名：孔令昌

个人的预报签字：卫星部第2分析预报组
张祖茂
樊常荣

预报时间：1995 年 4 月 16 日

通讯地址：[illegible]

邮政编码：



工作简讯

第五期（总第五十八期）

国家地震局地质研究所　　一九九五年十一月

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2. 我所十六名职工光荣献血
3. 我所1995年科技成果获奖情况简介
4. 我所完成国家经贸委交办的一项重要任务
5. 几次7级以上强震预报成功
6. 张强凹陷古构造应力场演化与油气聚集关係研究报告破例通过终审验收
7. 《广东三核电站沙环厂址设计基准地面运动特征》项目通过评审验收
8. 充分发挥科技优势，积极开展减灾知识宣传和学术研讨活动
9. 韩国地震科技代表团访问我所
10. 我所参与的中挪8-8A减灾合作项目取得初步成果
11. 我所一九九六年对外科技交流与合作计划项目已编制完成
12. 所安委会为职工更新自行车牌

Certificate of Prediction Accuracy issued by Institute of Geology, CEA

到高，还要安排重要首长听取汇报，国务院缺少一个救灾的补助标准，一般来的汇报团都有所收益，而那些在基层忙于救灾的干部，由于失去及时向中央汇报的时机，没有或较少得到中央补助的救灾款，有人形容这种现象为“会哭的孩子多吃奶”。

这种无序的状态不能再继续下去了，国务委员陈俊生要求制定加强抗灾救灾的条例，以便规范我国报灾、评估、补助的程序。这项工作由国家经贸委组织实施，经贸委将其中抗灾救灾的分级负责标准交给我所十三室及相关部门来完成。

两年多来，在马宗晋院士的领导下，十三室及相关部门的科研人员收集了全国各地1978-1994年的5000多条灾情和经济方面的数据资料，进行了大量的测算，作了几百张图，前后完成了七稿，征集了许多部门的意见，并召开了两次全国性学术研讨会，将我国三十个省（自治区、直辖市）划分成三类地区，每类地区都有八项申请补助的标准，凡达到其中两项标准的，不用来京汇报，就可能得到中央给予的补助。相反地，达不到标准的，即是来京，中央也可以不予受理。

为了协调中央有关部委的意见，国务院秘书局最近在中南海召开了会议，我所有三名科研人员作为专家参加。有关领导在会上肯定了我所参与的这项工作，表示不久将以此作为国务院的一项通知下发各地执行。

十三室　高建国

几次7级以上强震预报成功
——卫星热红外增温前兆短临预报又取得新进展

我所强震基研究员等与中国卫星气象中心副研究员梵常恭等合作，最近根据卫星热红外异常特征预报10月20日至11月25日在日本北海道南部（N39.6°—41.5°，E142.5°—144.3°）将发生7级以上地震，结果11月25日凌晨1点在北海道东（N44.5°，E149.3°）发生M_s6.8级地震（外电报道8.5级），三要素预报中地点稍差，差400-500km，其它都较准。另外，12月3、4日，又在千岛群岛发生6.8、7.4、7.3和6.8级强震，按国家地震局规定应达到二级预报标准。他们还预报今年4月16日至5月5日将在菲律宾萨马岛

Certificate of Prediction Accuracy issued by Institute of Geology, CEA

The Chinese scientists in the satellite thermal-infrared earthquake-prediction group led by QIANG Zuji and DIAN Changgong have carried on practicing short and impediment earthquake prediction for a long time. Our prediction practices started in 1990 and over the years we have made steady and great progress. During the 11 years from 1990 to 2000, we have made 149 predictions, of which 100 were valid and 49 were false alarms. Out of the 100 valid predictions, 65 were predicated with very good accuracy on the earthquakes occurred in mainland China and its neighboring sea and peninsula, including 10 earthquakes of Richter scale 7 or above, 19 of Richter scale 6 or above, and 36 of Richter scale 5 or so; 25 predictions were relatively accurate, including 4 of Richter scale 7; and 10 predictions were less accurate.

Because of the cloud interference, 49 predictions were false alarms and predictions were not made for 20 earthquakes (QIANG Zuji etal., 1998, 2001). WANG Chunying, a master graduate student of the Department of Geography at National Taiwan University, has based here thesis on our prediction practices (2005), and affirmed and gave a high appraisal to our prediction practices of more than 10 years. Based on the data of prediction cards issued for earthquakes of Richter scale 5 or above during the years 1990 to 2000, which she obtained from LI lingzhi, another collaborate researcher of our research, Ms. Wang summarized and evaluated our prediction practices in the following table. (Table II-1-1).

Table II-1-1 Statistics of Earthquake Predictions based on Thermal-Infrared Anomaly.

(After WangChun-Yin NTU, 2005)

Time	Number of Predictions	Prediction Grade (1-100 scale)				Success Rate
		Above 70	60-70	Below 60	False alarm	
1990-1995a	50		12	33	5	24%
1996a	13	3	3	6	1	46%
1997a	15	7	1	3	4	53%
1998a	21	11	5	3	2	76%
1999a	15	11	1	1	2	80%
2000a	5	4	0	0	1	80%

Note: Not including miss predictions.

INDUSTRY OUTLOOK

COMPILED BY MICHAEL G. LAVITT

CHINESE SATELLITE EARTHQUAKE PREDICTION

INVESTIGATORS FROM CHINA'S Seismological Bureau and Satellite Meteorological Administration have told European researchers that China has used satellite infrared ocean temperature data to predict about 20 earthquakes since 1990. The technique could have significant implications for predicting earthquakes in coastal areas. The satellite data show that ocean temperatures rose 1-3C in the South China Sea 4-10 days before numerous medium and large earthquakes. Using the space-based data, Chinese researchers said they missed predicting only two earthquakes during this period and predicted only two others that failed to occur. ■

AMRAAMS FOR F/A-18

U. S. NAVY F/A-18s now can carry AIM-120 Advanced Medium Range Air-to-Air Missiles on operational missions. The USS Abraham Lincoln, now on station in the Arabian Gulf, has a store of AMRAAMs that will be used on Hornets participating in Operation Southern Watch over Iraq. In September, F/A-18 units in the U. S. fired 29 AMRAAMs in exercises with a success rate of 95%, McDonnell Douglas officials said. The missile, combined with the latest operational flight program, allows aircrews better situational awareness through improved displays, for a sorting of targets and better target information. ■

GERMAN HYPERSONIC STRETCHOUT

A 20% REDUCTION in the planned budget for Germany's hypersonic research propulsion program will result in a stretchout of the Phase 1 technology by two years to 1995. Greater emphasis will be given to air-breathing propulsion technology during the extended Phase 1 effort. The objective is to develop a scalable ramjet propulsion system with a 50-cm. (20-in.) inlet diameter that in 1995 would be tested in a hypersonic wind tunnel. The budget reduction has forced cuts in research on aerothermodynamics, materials and structures. ■

BRAZIL, CHINA PLAN JOINT EFFORT

CHINA IS TO BUILD two satellites for Earth-imaging and atmospheric monitoring in cooperation with Brazil, according to Chinese reports. The $150-million project was first proposed in 1988 but proposed for lack of funds. China is to contribute 70% of the financing and Brazil the rest. First launch is set for October, 1996, on board a long March 4 booster. A small Brazilian scientific satellite will piggyback on the first launch. A date for the second has not been set. China also is seeking broader access to Brazil's vast mineral deposits. ■

INNOVATIVE MANAGEMENT

AEROSPATIALE HAS DEFINED a small, highly integrated group of engineers and managers for development of the French TAOS light satellite network that would involve five 150-kg. (330-lb.) spacecraft for navigation positioning and message transmission. By increasing the authority of middle managers to make and carry out their own decisions in the project—as opposed to requiring involvement by higher-level managers—Aerospatiale believes it will minimize the number of approvals and reviews in the program, saving time and money and boosting morale. ■

HUGHES TO BUILD WEAPONS TRAINER

HUGHES TRAINING plans to build an F/A-18C Weapons Tactics Trainer for Finland's air force under a $26-million contract from McDonnell Douglas. The single-seat simulator is to be delivered in mid-1996. It will feature a 40-ft. dome and a data base that encompasses all of Finland. A Martin Marietta CompuScene 3 image generator will produce photo quality images for the day/night, head-tracked display system. ■

RAMJET-AIDED GYROPLANE FOR UAV ROLE

GROEN BROTHERS AVIATION will offer a version of its Hawk 2 gyroplane with ramjet-tipped rotor blades for the U. S. Navy's vertical launch and recovery unmanned aerial vehicle. The UAV is to have a range of 100-nast. mi., 5-hr. endurance and a top speed of 150 kt. with a 200-lb. payload. The UAV's role is surveillance and communications relay. The Hawk 2 is to fly primarily as a gyroplane using a pusher propeller for thrust. The design eliminates the need for a rail rotor, transmission and drive shaft. ■

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COMPILED BY MICHAEL O. LAVITT

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此消息是美国NASA对地球观测主任 Louis Walter 博士，在听了我在1993年10月在奥地利格拉茨47届宇航大会IAF Congress上发言后，很赞誉，他写的稿在美国航空航天刊物上发表。

[illegible] 1996.7.月3日

My success rate of earthquake prediction using thermal-infrared remote-sensing technology was not as good as it is now. I have had more false predictions than successful ones in the beginning. however, I have learned from my failures and kept practicing and improving this earthquake prediction technique. I believe wisdom comes from the practices.

I am confident that precursors can be found before an earthquake and that earthquake prediction IS possible.

Earthquake precursors should enable a predicator to give the three elements of a future earthquake: place, magnitude and time。（Max Wyss, 1993, former chairperson of Earthquake Prediction Committee, IASPEI）.

Thank You!