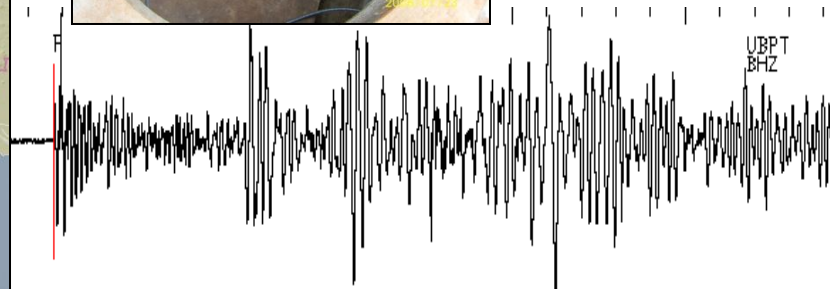
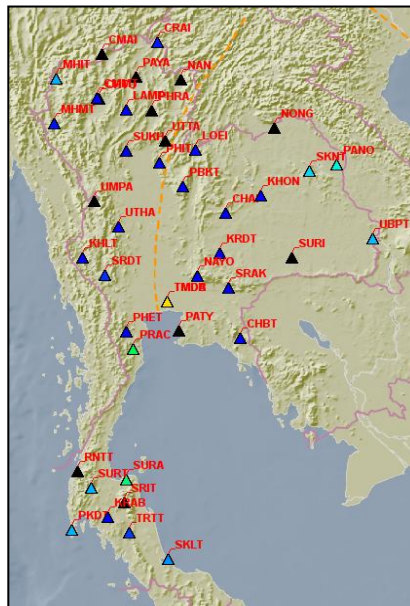




# TMD. Seismic Network



**Patinya Pornsopin**  
**Seismological Bureau, TMD.**

**IRIS Workshop 8-14 Jan 2012, Bangkok**

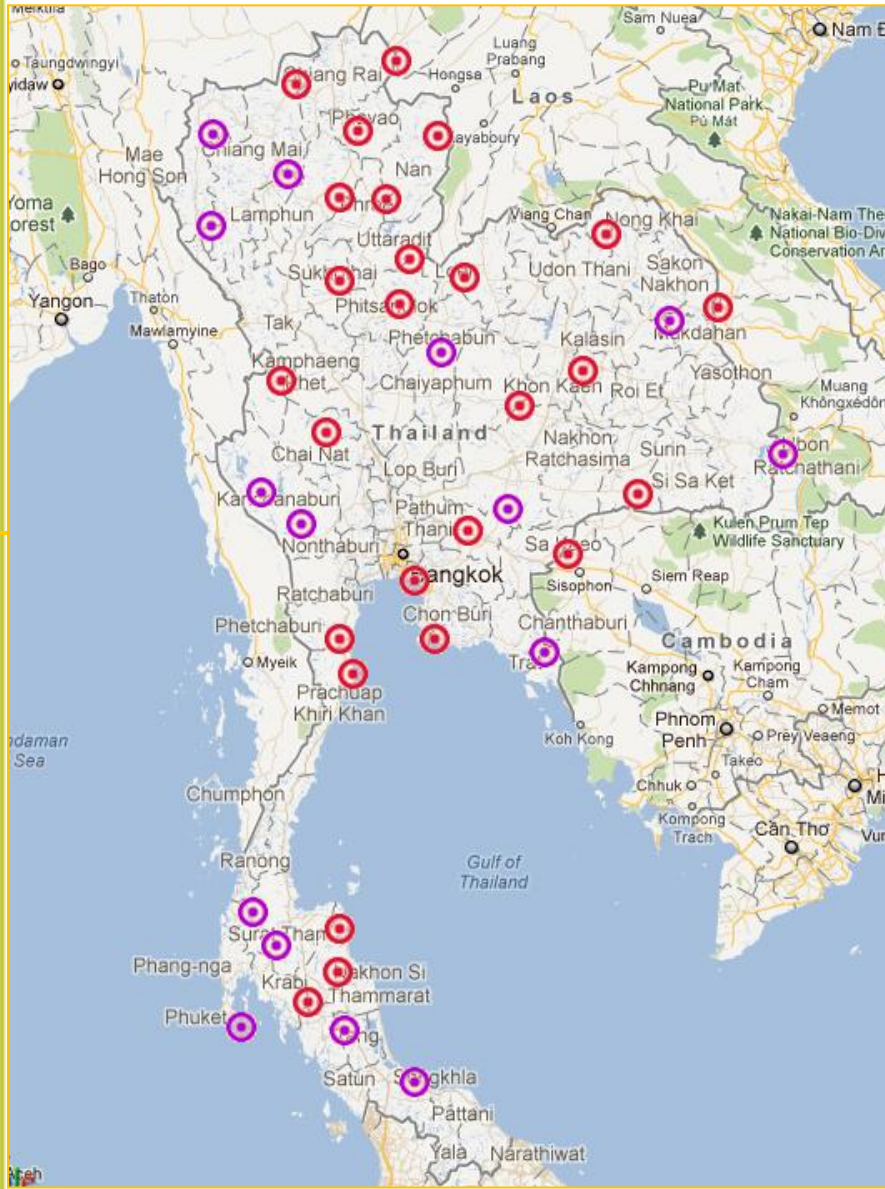


## Development of seismic network in Thailand

- **1975 - present** 14 Analog Stations (SP 1s)
- **1998 - 2007** 13 Digital Stations with L4-C, CMG-40 seismometers & SSA-320 accelerometers
- **2006(oct) - present (Phase 1)** 15 Digital Stations (8MP 40s & 7BB 120s) with Nanometric Trillium-40, Trillium-120 seismometers and TSA-100S accelerometers
- **2009(jan) - present (Phase 2)** 26 Digital Stations (15SP 1s , 10BB 120s and 1Borehole) with Geotech S-13, KS-2000M seismometers and PA-23 accelerometers



## Real-Time Seismic stations



### Phase 1

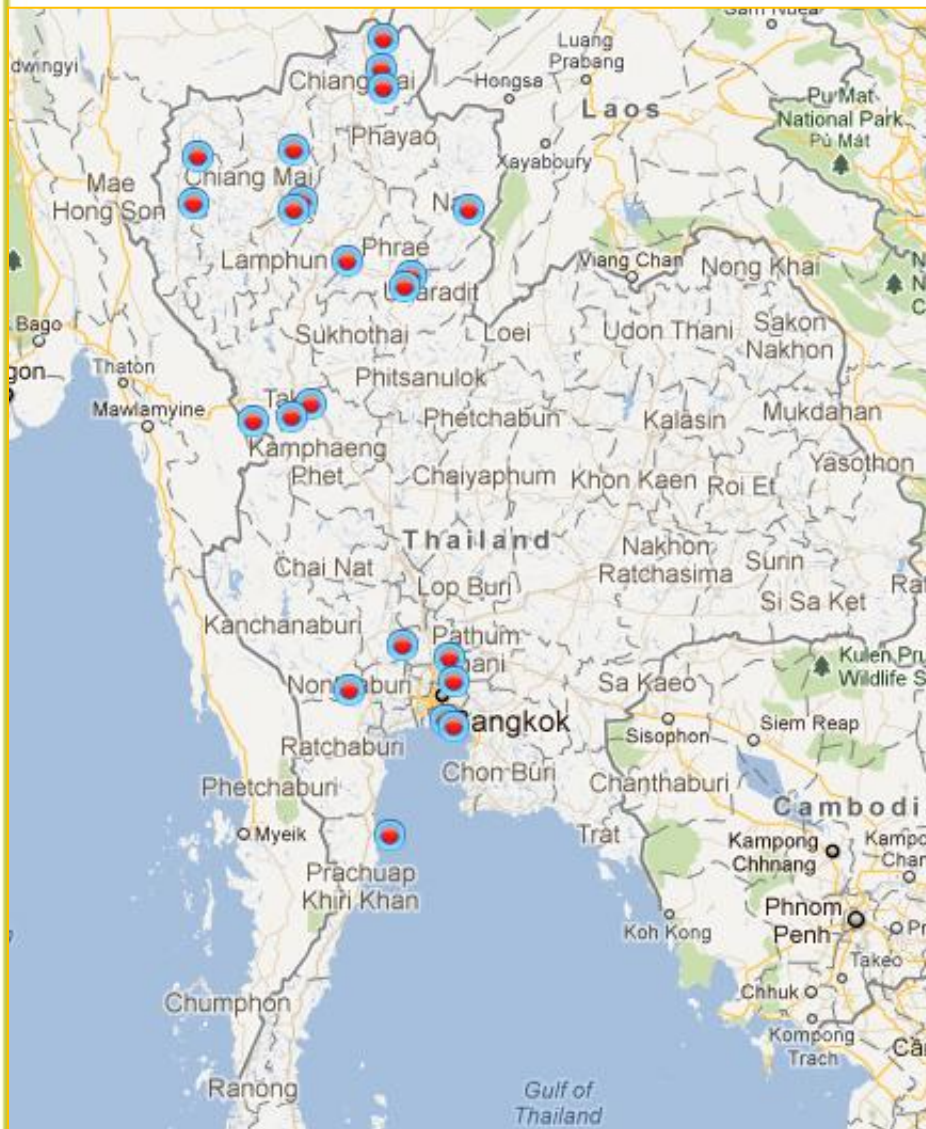
- 15 stations (8MP 40s, 7BB 120s)
- Seismometers with Nanometric Trillium-40 & Trillium-120
- Dataloggers with Nanometric Taurus
- Sampling rate 100Hz
- Real time telemetry via (TCP/IP) Internet ADSL or IP-star satellite

### Phase 2

- 26 stations (15SP 1s, 11BB 120s)
- Seismometers with Geotech S-13 , KS-2000 & KS-2000BH
- Dataloggers with Geotech Smart-24
- Sampling rate 50Hz for SP and 100Hz for BB
- Real time telemetry via (TCP/IP) Internet ADSL or IP-star satellite



## Strong motion acceleration stations



### 26 strong motion station

- 6 stations with TSA-100S + Taurus
- 20 stations with PA-23 + Smart-24
- Sampling rate 100Hz
- 3 components
- Data transfer via Dial-up modem



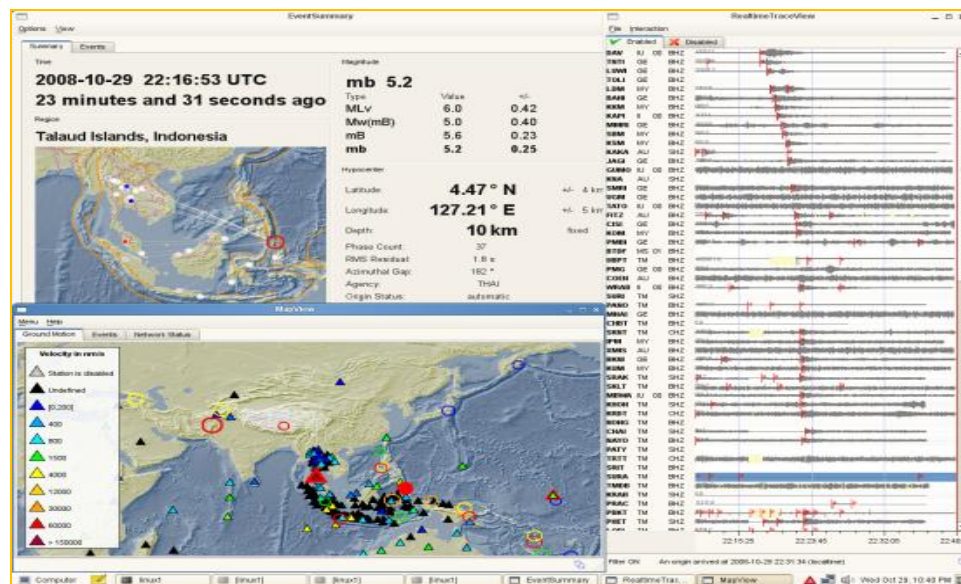
## PBKT Seismic stations





# Real-Time Data Acquisition

- Data acquisition by NAQs, SmartGeoHub and SeisComP3
- Daily ~2.0 GB of 6 channels 100, 50 Hz from 41 permanent seismic station (seiscomp3)
- Archive of continuous data on harddisk





**IRIS, GEOFON, BMG realtime  
SeedLink Server ~200 stations**

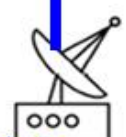
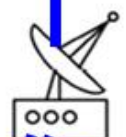
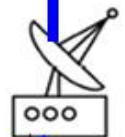
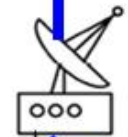
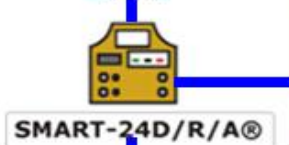
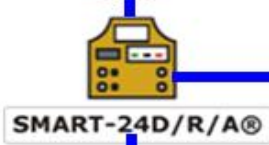
**CTBT realtime seismic data  
(CMAR Array & Primary station)**

**Trillium 120s  
7 stations**

**Trillium 40s  
8 stations**

**S-13 1s  
15 stations**

**KS-2000 120s  
10 stations**



IP-Star or ADSL  
Internet (TCP/IP)

IP-Star or ADSL  
Internet (TCP/IP)

**NAQS Server**

**SeisComp3 Acquisition Server  
TMD SEED-Link Server**

**Smart Server**

**Automatic analysis  
(SeisComp3)  
(EarlyBird & Earthworm)**

**Off-line analysis  
(SeisComp3)**




สำนักเฝ้าระวังแผ่นดินไหว กรมอุตุนิยมวิทยา TH / EN  
www.seismology.tmd.go.th




2554-12-14 09:09:20  
ศูนย์กลาง: อ.แม่เมาะ จ.ลำปาง  
Lat: 18.37, Long: 99.68  
ขนาด: 2.5

สำนักเฝ้าระวังแผ่นดินไหว  
www.seismology.tmd.go.th

www.seismology.tmd.go.th

\* คลื่นที่ขึ้นเวลาของแต่ละเหตุการณ์แผ่นดินไหวเพื่อดูแผนที่  
\*\* Phase = จำนวนสถานีตรวจวัดแผ่นดินไหวที่ใช้ในการคำนวณหาศูนย์กลางแผ่นดินไหว  
\*\*\*  = เหตุการณ์ที่ได้รับแจ้งรู้สึกถึงความสั่นไหว คลื่นที่ icon เพื่อรายละเอียด

| วัน-เวลา            | *ประเทศไทย | ขนาด | Latitude | Longitude | Phase | บริเวณที่เกิด     |
|---------------------|------------|------|----------|-----------|-------|-------------------|
| 2554-12-15 23:12:27 |            | 2.3  | 20.69    | 98.57     | 19    | ประเทศพม่า        |
| 2554-12-14 09:09:20 |            | 2.5  | 18.37    | 99.68     | 12    | อ.แม่เมาะ จ.ลำปาง |
| 2554-12-12 21:14:58 |            | 4.8  | 19.77    | 96.01     | 9     | ประเทศพม่า        |
| 2554-12-11 16:55:44 |            | 3.8  | 20.81    | 99.84     | 11    | ประเทศพม่า        |
| 2554-12-11 15:15:51 |            | 3.2  | 21.02    | 99.42     | 8     | ประเทศพม่า        |
| 2554-12-11 14:03:47 |            | 2.6  | 19.82    | 98.89     | 9     | ประเทศพม่า        |
| 2554-12-11 01:24:52 |            | 3.3  | 21.43    | 97.70     | 8     | ประเทศพม่า        |





## TMD share data for IRIS DMC



Usage

### IRIS DMC MetaData Aggregator

Legend: **R** **A** **R** **P**

### Network summary (1 time span)

|            |   |
|------------|---|
| Network    | TM :: Thai Seismic Monitoring Network :: <a href="#">TM Network Map</a> |
| Start Year | 2008  |
| End Year   | 2500  |

### Stations for TM network 2008 to 2500 (11 stations)

| Station                                | Site                                     | Latitude | Longitude | Elevation | First start | Last end   |
|--|--|----------|-----------|-----------|-------------|------------|
| <b>A</b> <a href="#">CMAI</a>          | Nakornpanom Station, Thailand            | 17.15    | 104.61    | 135.6     | 2009/01/01  | 2599/12/31 |
| <b>R</b> <b>A</b> <a href="#">CMMT</a> | Chiengmai1 Station, Thailand             | 18.81    | 98.95     | 399.7     | 2009/01/01  | 2599/12/31 |
| <b>R</b> <b>A</b> <a href="#">LOEI</a> | Loei Station, Thailand                   | 17.51    | 101.26    | 305.6     | 2009/01/01  | 2599/12/31 |
| <b>R</b> <b>A</b> <a href="#">MHIT</a> | Mae Hongson Station, Thailand            | 19.31    | 97.96     | 270       | 2009/01/01  | 2599/12/31 |
| <b>A</b> <a href="#">PANO</a>          | Nakornpanom Station, Thailand            | 17.15    | 104.61    | 135.6     | 2009/01/01  | 2599/12/31 |
| <b>R</b> <b>A</b> <a href="#">PBKT</a> | Phetchabun Station, Thailand             | 16.57    | 100.97    | 8         | 2009/01/01  | 2599/12/31 |
| <b>R</b> <b>A</b> <a href="#">PHRA</a> | Phrae Station, Thailand                  | 18.50    | 100.23    | 186.8     | 2009/01/01  | 2599/12/31 |
| <b>R</b> <b>A</b> <a href="#">SKLT</a> | Songkhla Station, Thailand               | 7.17     | 100.62    | 14.5      | 2009/01/01  | 2599/12/31 |
| <b>R</b> <b>A</b> <a href="#">SRIT</a> | Nakonsritamarat Station, Thailand        | 8.60     | 99.60     | 58.5      | 2009/01/01  | 2599/12/31 |
| <b>R</b> <b>A</b> <a href="#">TMDB</a> | BangkokBB_BH_low_level Station, Thailand | 13.67    | 100.61    | -47       | 2009/01/01  | 2599/12/31 |
| <b>R</b> <b>A</b> <a href="#">UBPT</a> | Ubonrachatani Station, Thailand          | 15.28    | 105.47    | 120       | 2009/01/01  | 2599/12/31 |



**Thank you for your attention**

