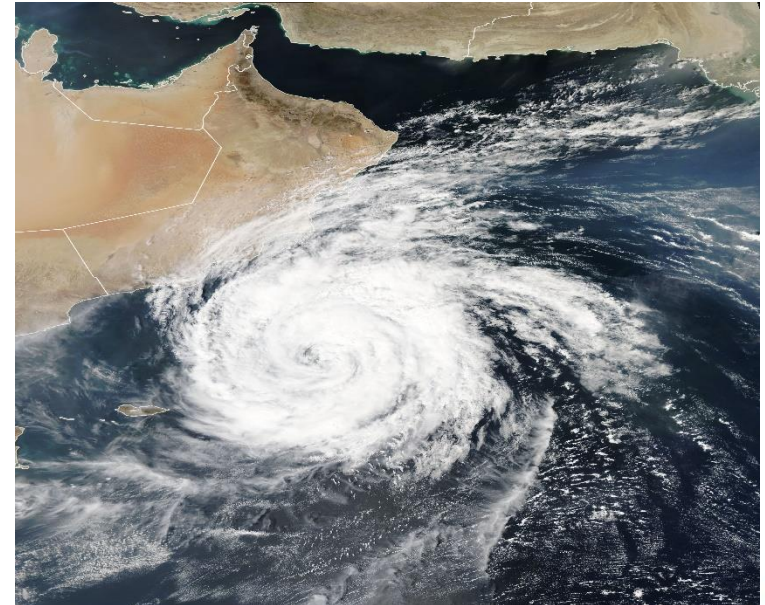


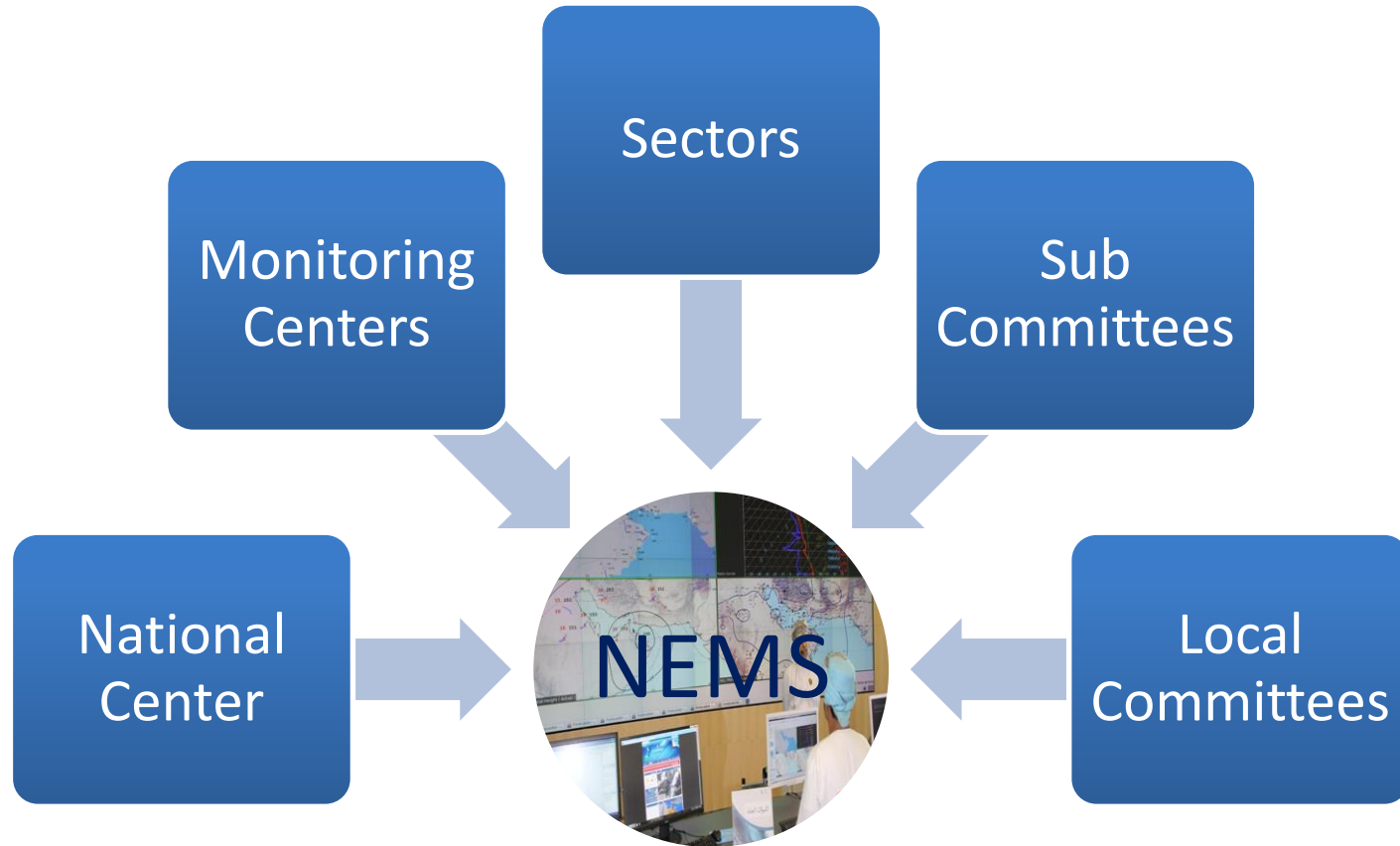
Oman Experience on the use of ICT in disaster risk reduction and disaster management



Regional multi-stakeholder workshop on the Role of Telecommunication/ICT for Disaster Risk Reduction and Management for Arab Region

Mohammed H Alkindy
Telecommunications Regulatory Authority (TRA Oman)
Sunday, November 24, 2019
Mohammed.kindy@tra.gov.om

National Emergency Management System (NEMS)





Sectors



Media Sector and Public Awareness

Search & Rescue Sector

Relief & Shelter Sector

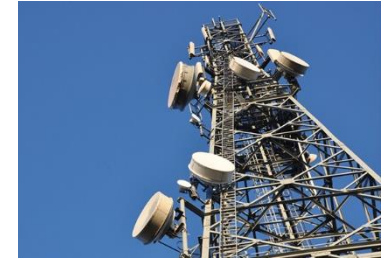
Medical Response & Public Health

Basic Services Sector

Hazardous Material Sector

Victims & Missing Persons Affairs

Monitoring early warning

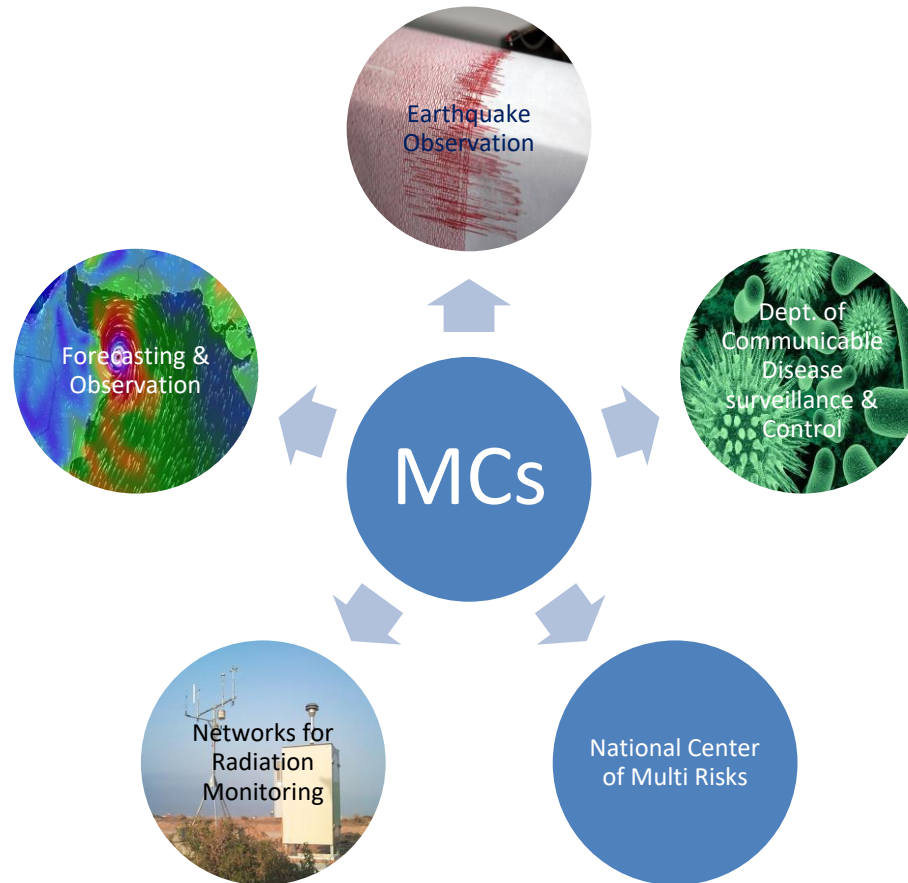




Resent Oman Meteorological Events

- June 2007 – Cyclone **Gonu** making it the strongest tropical cyclone on record to strike Oman
- June 2010 – Cyclone **Phet** made landfall in eastern Oman dropping heavy rainfall and damaging roads and power lines, and washed away hundreds of cars.
- May 2018 – Cyclone **Mekunu**
- October 2018 - Cyclonic Storm **Luban**

Monitoring Centers (MCs)



Computing power for Mapping & Modeling



- **Tsunami**
- **Wind data & Weather Forecasting**
- **Pollution Tracking**

Computing power for Mapping & Modeling

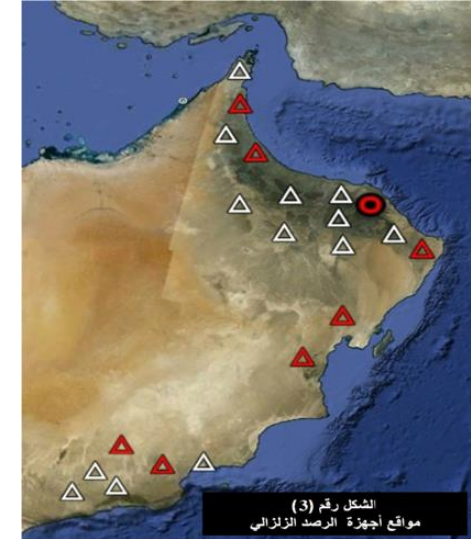
	Model المجسم	الجودة Resolution	Global Data المعطيات الخارجية	Type نوع المجسم	Run time (Min) الوقت المطلوب لإنهاء العمليات الحسابية (دقيقة)
Atmospheric	COSMO	7 km	ICON	Atmospheric للغلاف الجوي	50
		2.8 km			45
Tropical Cyclones	HWRF	27 km	GFS	TC + static للأعاصير	130
		9 km			
		3 km			
Wave Models	WAM	14 km	ICON	Wave لأمواج البحر	15
		3.5 km			45



Earthquake Monitoring Center (EMC)



Sea level Network



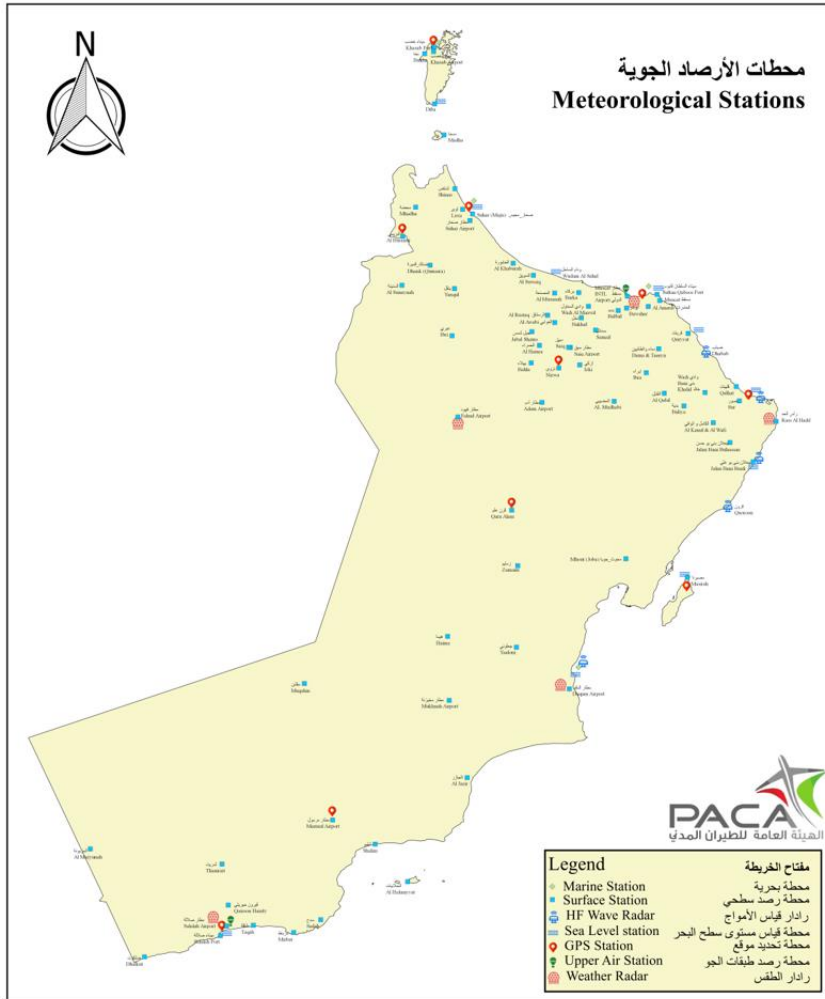
Seismic Network



Earthquake Monitoring Center @ Sultan Qaboos University

Weather Forecasting

Network of Met Stations

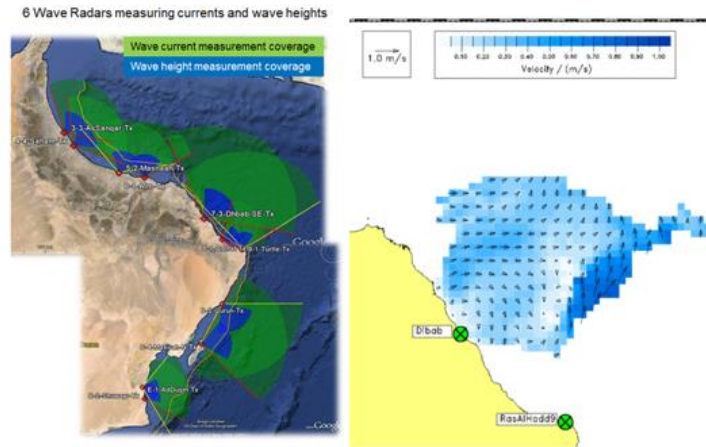


Legend

مفتاح الخريطة

- | | |
|----------------------|---------------------------|
| ◆ Marine Station | محطة بحرية |
| ■ Surface Station | محطة رصد سطحي |
| ⚡ HF Wave Radar | رادار قياس الأمواج |
| 🌊 Sea Level station | محطة قياس مستوى سطح البحر |
| 📍 GPS Station | محطة تحديد موقع |
| 🌡️ Upper Air Station | محطة رصد طبقات الجو |
| ☁️ Weather Radar | رادار الطقس |

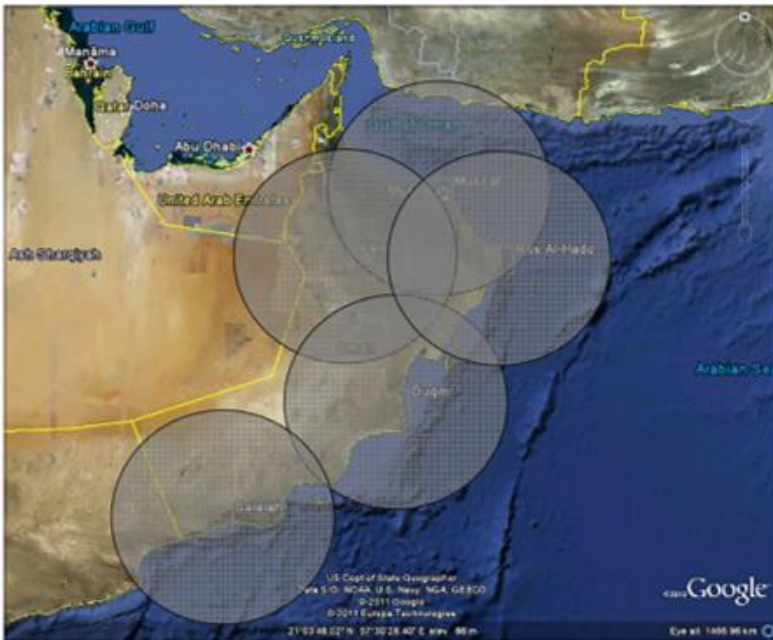
Weather Forecasting



6 Wave Radars

4 Marine Stations

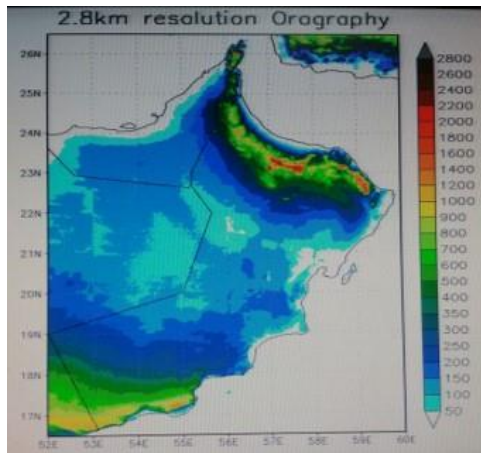
Weather Forecasting



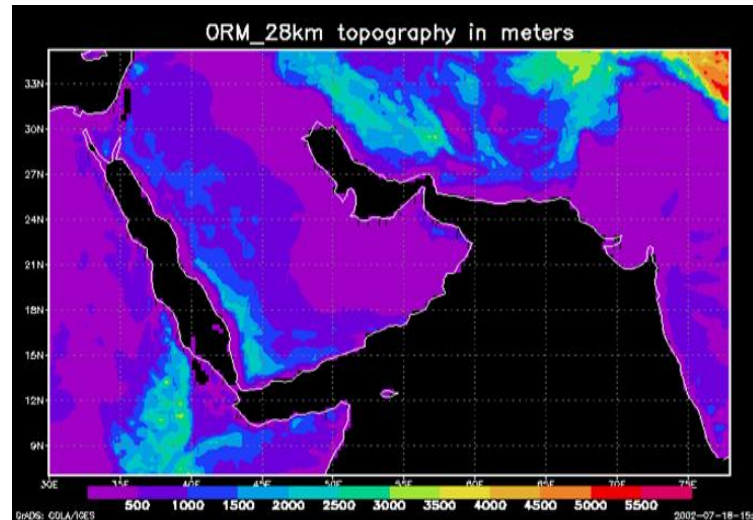
5 Weather Radars



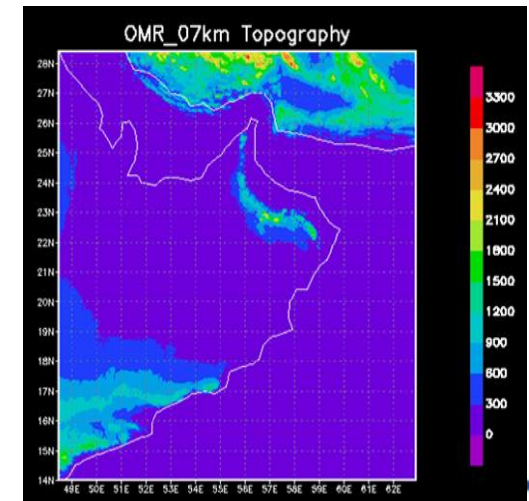
Weather Forecasting



Omani Model
Res: 2.8 km



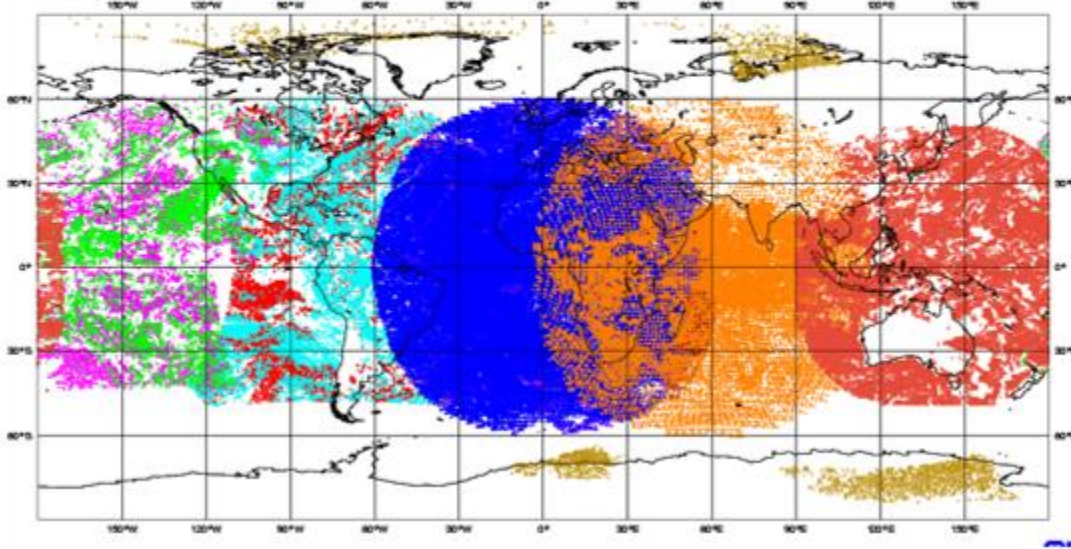
Omani Model
Res: 28 km



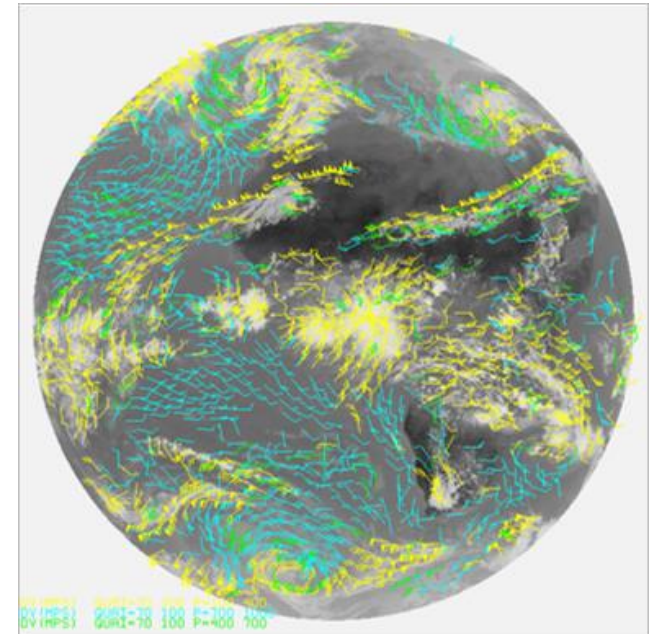
Omani Model
Res: 7.0 km

Weather Forecasting

29/OCT/2007; 00 UTC
Total number of obs = 292633

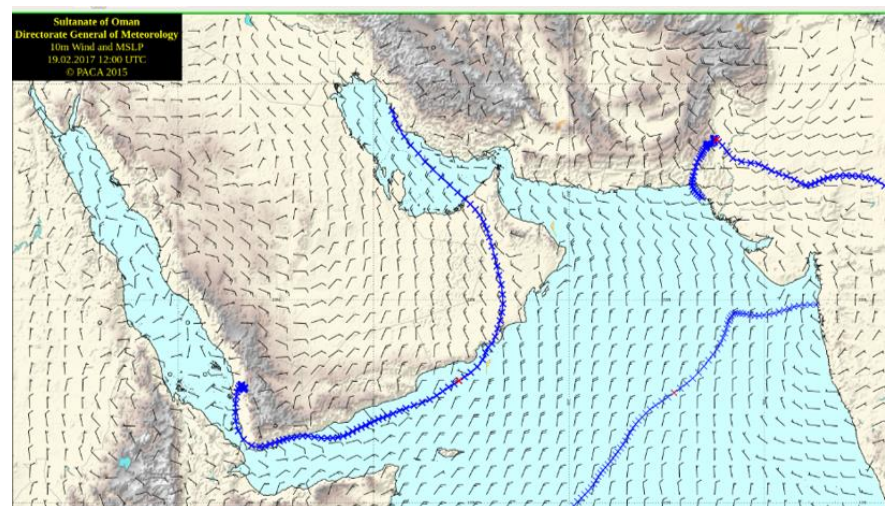
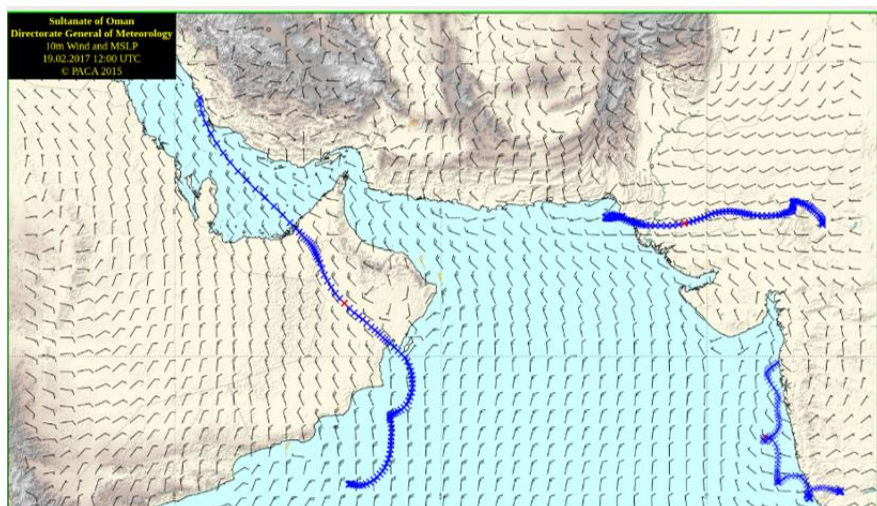


Satellite data is used as input into NWP models

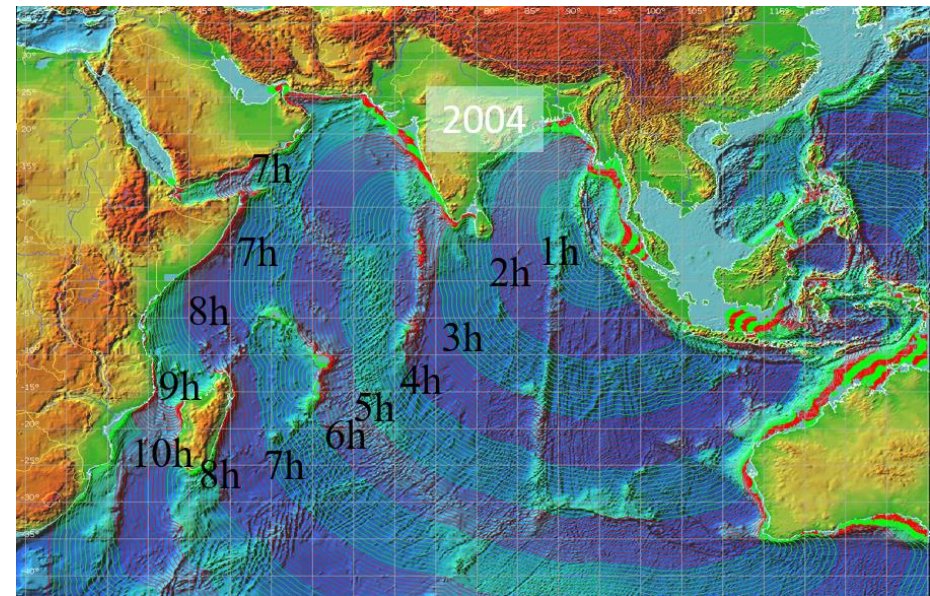
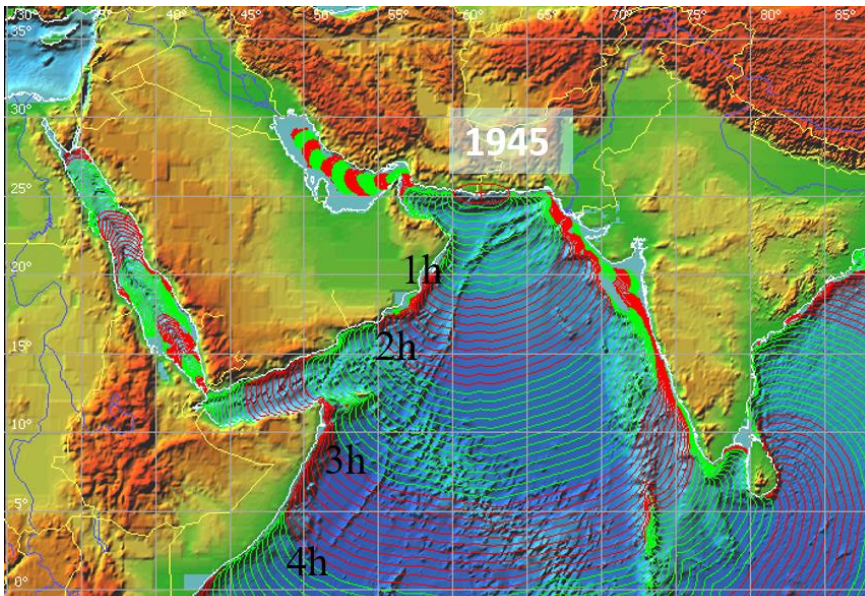


Wind data can be obtain indirectly from satellites

Model Forward Trajectories (Pollution Tracking)

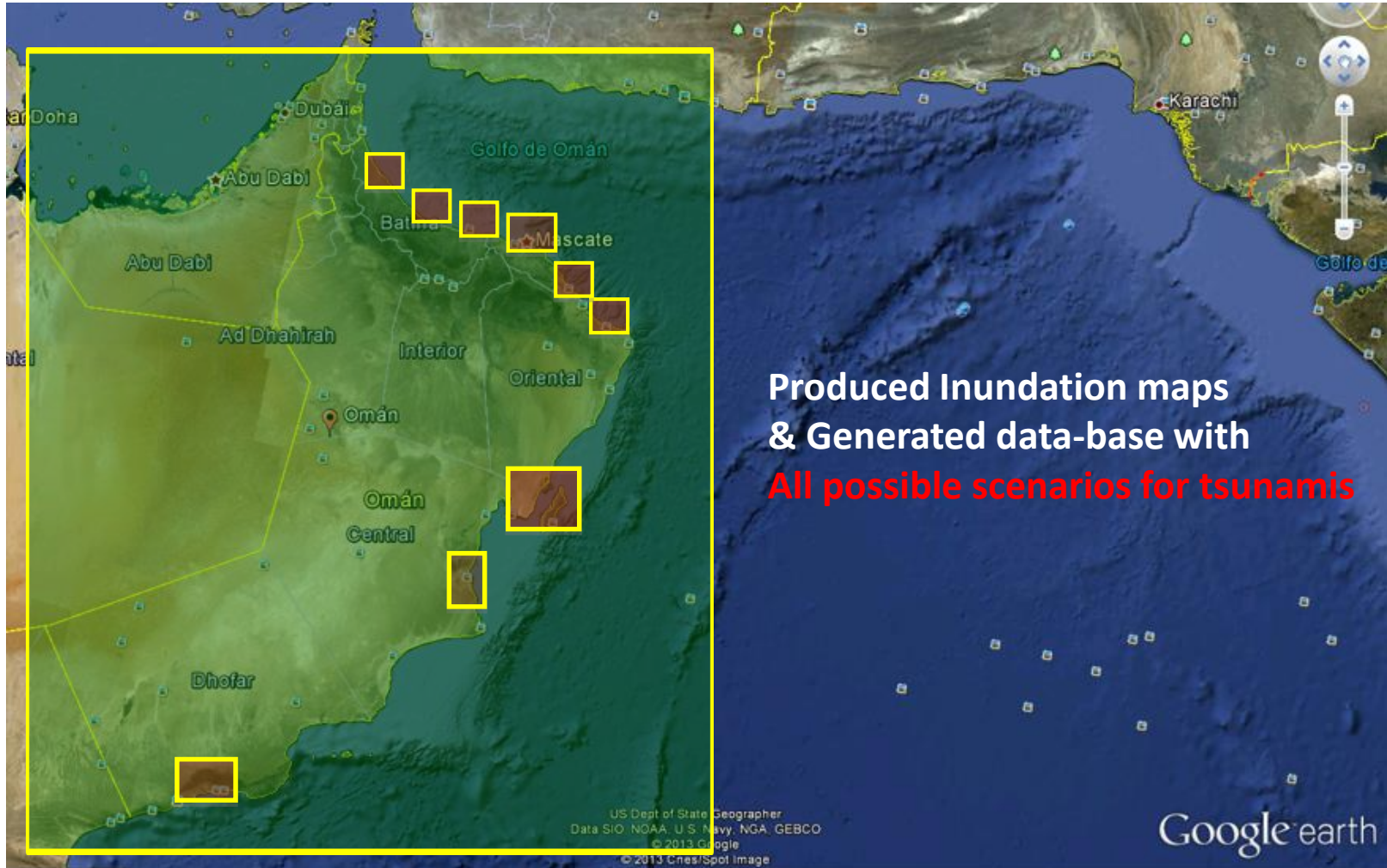


Two sources of tsunami might affect Oman coasts



Time for propagation of **tsunami waves**

Risk Assessment Study



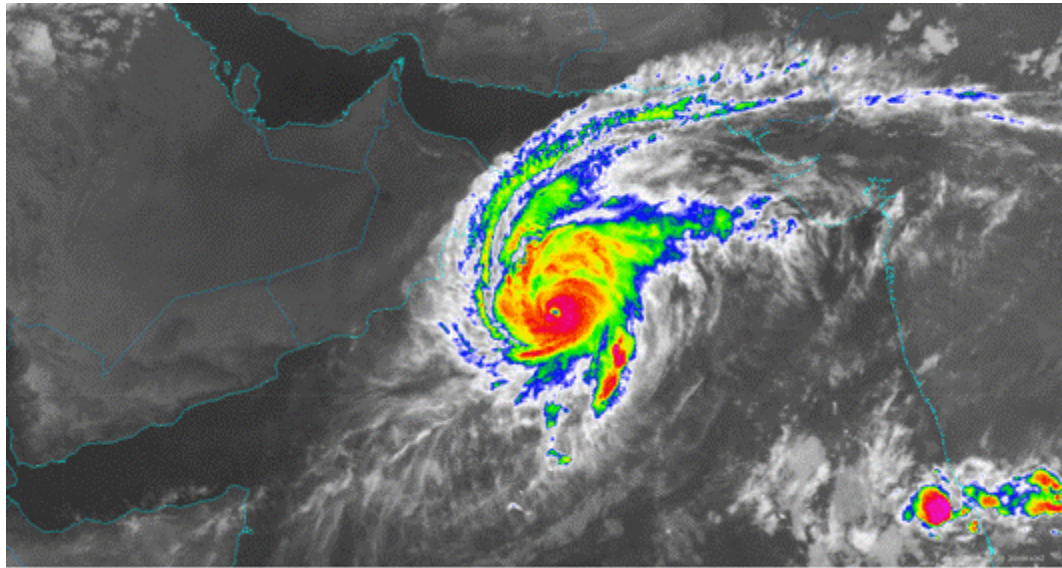
Produced Inundation maps
& Generated data-base with
All possible scenarios for tsunamis

Guno 2007 Flash Floods





Nilofar October 2014



Mapping of Flash Floods (**Dry Rivers!**)



Rain Fall monitoring for Water level



Rain Fall monitoring for Water level

Wadi Dhiqa



Mapping of Flash Floods



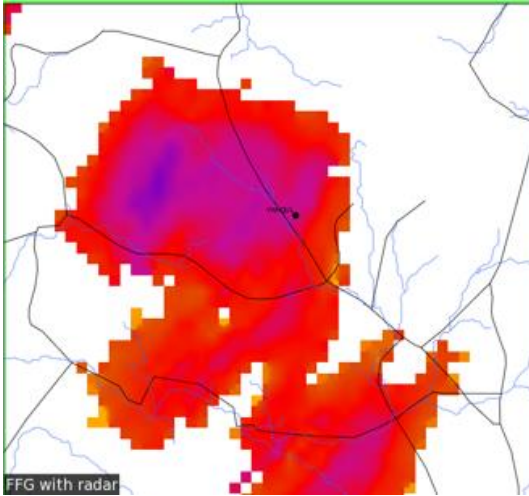
Dry Rivers

Flash Flood Guidance System

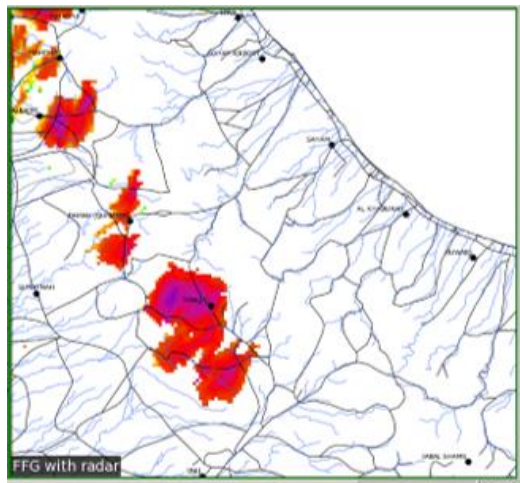


To provide Oman metrological service with **real time** information guidance to warn for flash floods

Flash Flood Guidance System

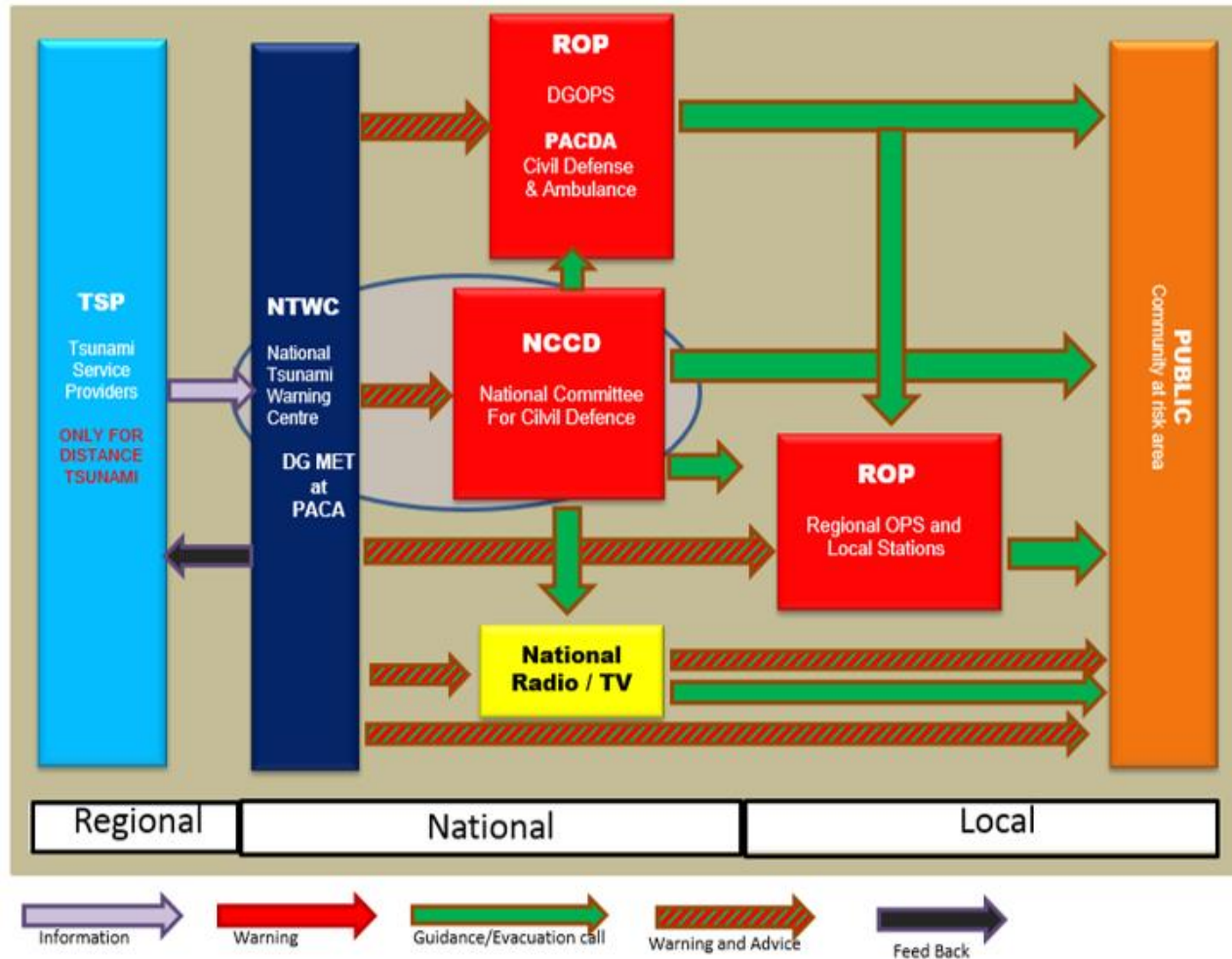


- Network of rainfall Observations
- Weather Radars observed rainfall estimates
- Satellites observed rainfall estimates
- NWP rainfall forecasts

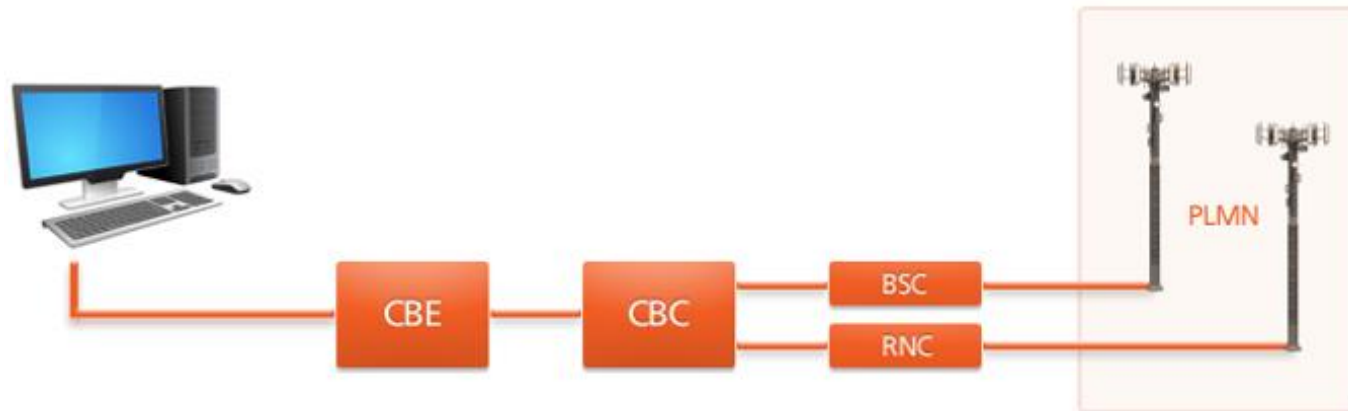


- Flash Flood Guidance products (1 – 6h lead time)
- Warnings are transmitted to public & main stakeholders (National Civil Defense, Police Ops & Water Resources)

Standard Operating Procedures



Implementation of **Cell Broadcast Service**



- To alert the public by integrating with the **Early Warning System**.
- **Geofencing** introduced to define the effected area
- **CAP** (Common Alert Protocol), ITU-T X.1303. as integration protocol

CBE: Cell Broadcast Entity
CBC: Cell Broadcast Center

Cell Broadcast Service

- Developed **country specific** Handset standard to enable the CBS in mobile platforms



- Approached Handset manufacturers to enable the CBS on their handsets.

Drills (Simulations)



- CBS tests concluded using test handsets.
- Awaiting vendors releases

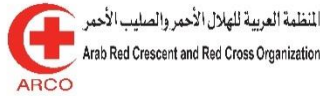
Communication with Public



Live Satellite broadcast



**State of the art Studio, linked to National TV
Fiber optic network with HD Codecs**



Social Media channels



الأرصاد الجوية العمانية
@OmanMeteorology

الحساب الرسمي للأرصاد الجوية العمانية - الهيئة العامة
للطيران المدني
Meteorology-PACA-Sultanate of Oman

1 Following 658K Followers

11/10/2017

764K Followers as of 20/11/2019

الأرصاد العمانية
19.7K Tweets

1 Following 762K Followers

Tweets Tweets & replies Media Likes

الأرصاد العمانية @OmanMeteor... 2h
تنبيه بغزارة الأمطار المتوقعة خلال الساعات القادمة

التاريخ: 12 ربيع الأول 1441هـ
مدة صلاحية التنبيه: من الساعة الخامسة مساءً إلى الساعة العاشرة مساءً بتوقيت السلطنة
الإصدار: (3)

تنبيه بغزارة الأمطار

نظراً لغزارة الأمطار الرعدية والمحمّل استمرار هطولها على محافظة شمال الباطنة خلال الساعات القادمة والتي قد تكون مصحوبة بهبوب رياح نشطة وتساقط لحيات البرد مع نزول لبعض الأودية، وانخفاض الرؤية الأفقية، وبصاحبه ارتفاع في موج البحر، تهب الهيئة العامة للطيران المدني الجتمع بضرورة أخذ الحيطة والحذر لتجنب حصول الأمطار الرعدية وعدم عبور

10 138 206

Retweeted by الأرصاء العمانية

الهيئة العامة للطيران المدني @PA... · 5h
تقرير (2) : تأثر أجواء السلطنة بأخود من منخفض جوي خلال الفترة من 11 - 9 نوفمبر 2019

weather report (2) from 9 -11 November 2019
pic.twitter.com/HFVKRNhVc



Thank you