

T4.1-P26: Importance of local network in processing discrimination of sources

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Introduction :

The IMS station PS42 located at Kesra, TUNISIA was installed on February 2006 and started forwarding data on March 2006. PS42 station is a broadband 3-component CMG-3TB system. The sensor is installed in a 100m deep borehole. The equipment at PS42 is powered by a pack of 12 V Batteries and 320W solar pannels. Data is transmitted to the Central Recording Facility through radio-telemetry (WI-LAN) network, and forwarded to the IDC/Vienna and the NDC/Tunis through a VSAT link.

Abstract:

Based on the IMS statistical assessments done on historically recorded earthquakes in Tunisia and the Mediterranean, it was noticed a certain shortness in locating all events triggered in Tunisia. This issue may result essentially from the geodynamic structure of the country location as well as from the insufficient number of seismic stations in that area.

Consequently, a risk that a suspect event conducted in the vicinity of our territory can not be detected. An overview of this statistic will be highlighted over this poster with a glance to the possible solutions to overcome this issue.

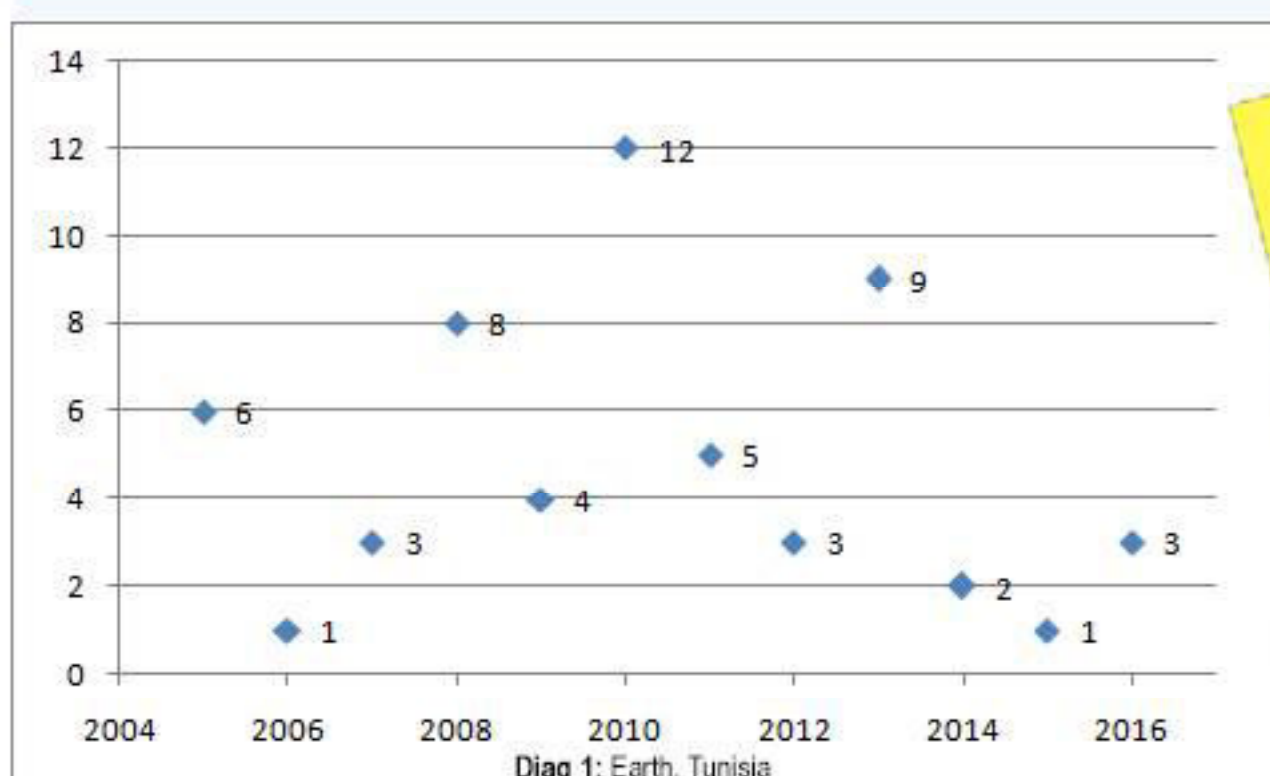
Tunisian IMS Station Statistics:

Period of study: From 1st January to 31st October 2016,
 Station : PS42 (Station Code KEST),
 Data : Downloaded from the IDC secure web site (AutoDRM request),

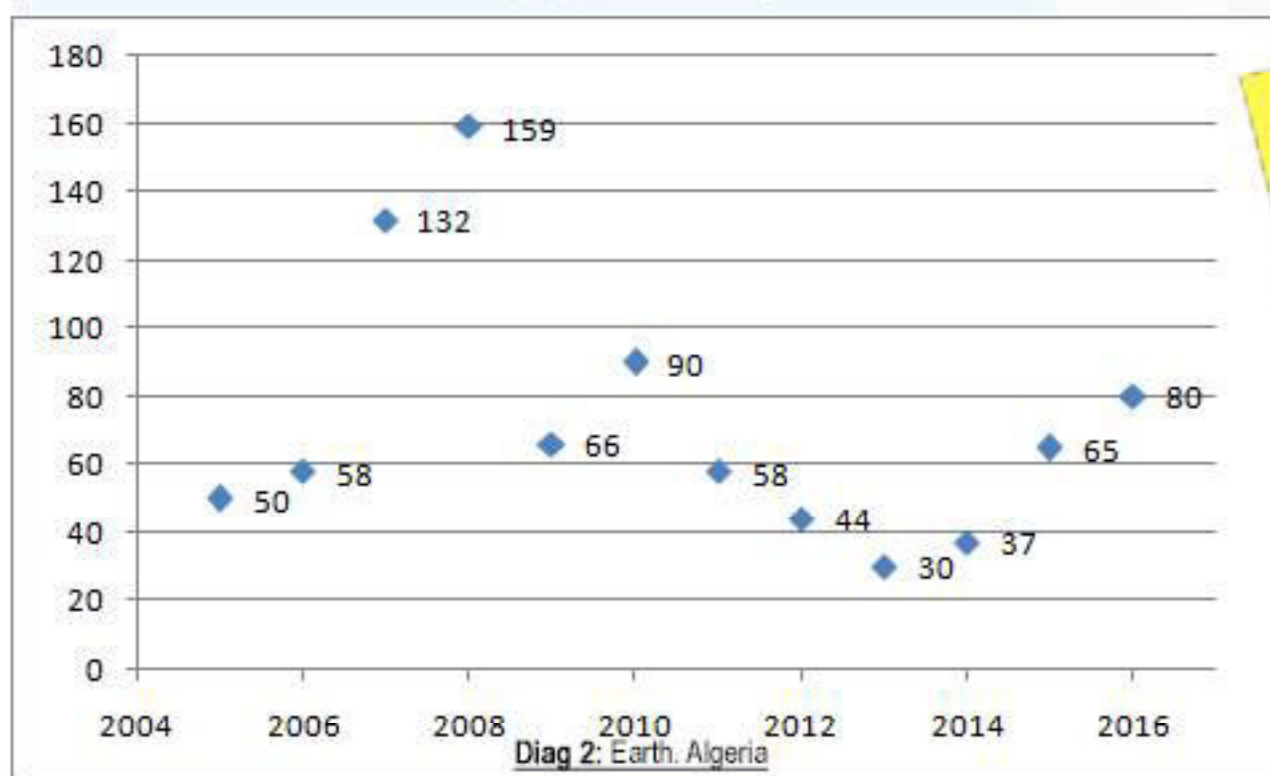
IMS Bulletin	SEL3 (Standard Event List 3): is the most refined automatic list of events issued by the IDC.	Total Events : 48067 Events detected by KEST : 1643 => 3% of events
	REB (Reviewed Event Bulletin): Is the set of events confirmed and corrected by skilled analysts in the IDC	Total Events : 32048 Events detected by KEST : 2131 => 7% of events

Interpretation :
 KEST contributes well on the IMS bulletins,

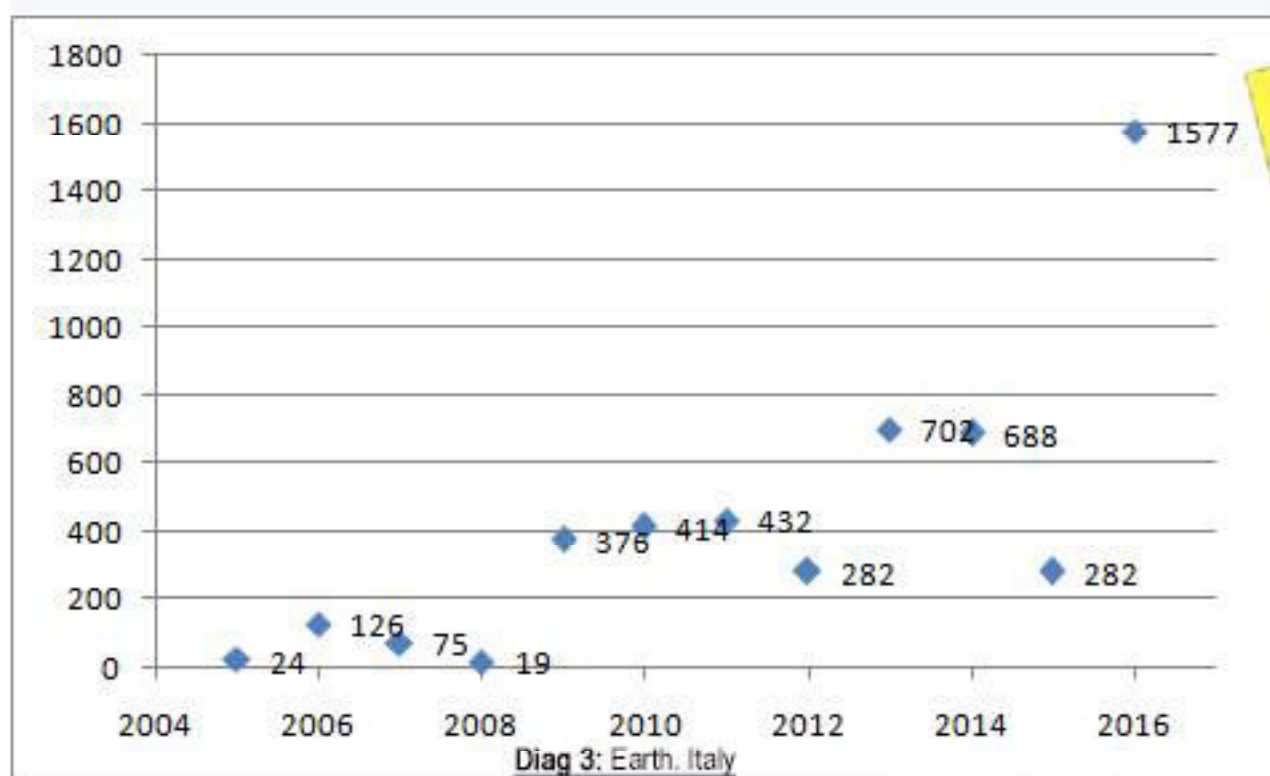
Seismicity statistics view (nearby countries):



Country : Tunisia
 Average : 5 earth./year
 Maximum: 12 / 2010
 Minimum : 1

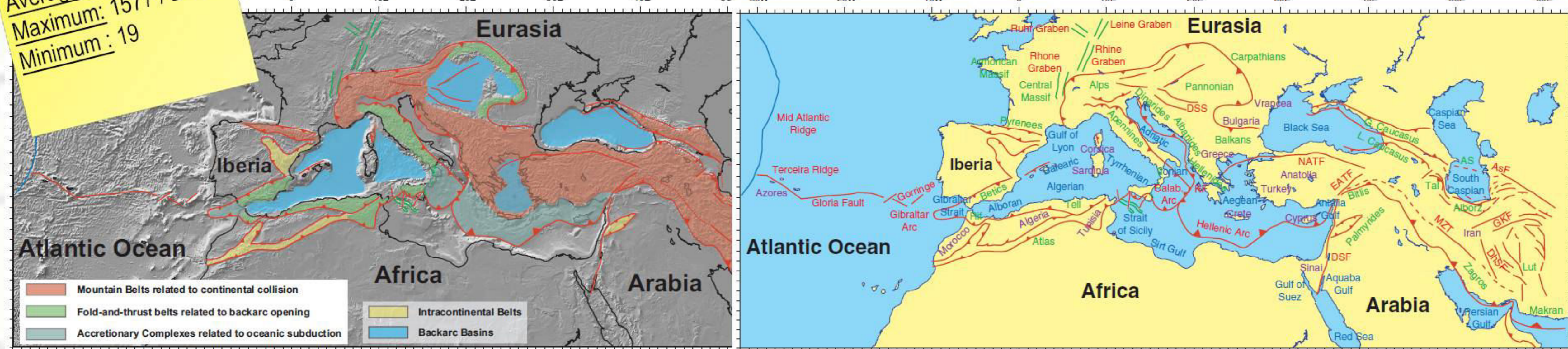
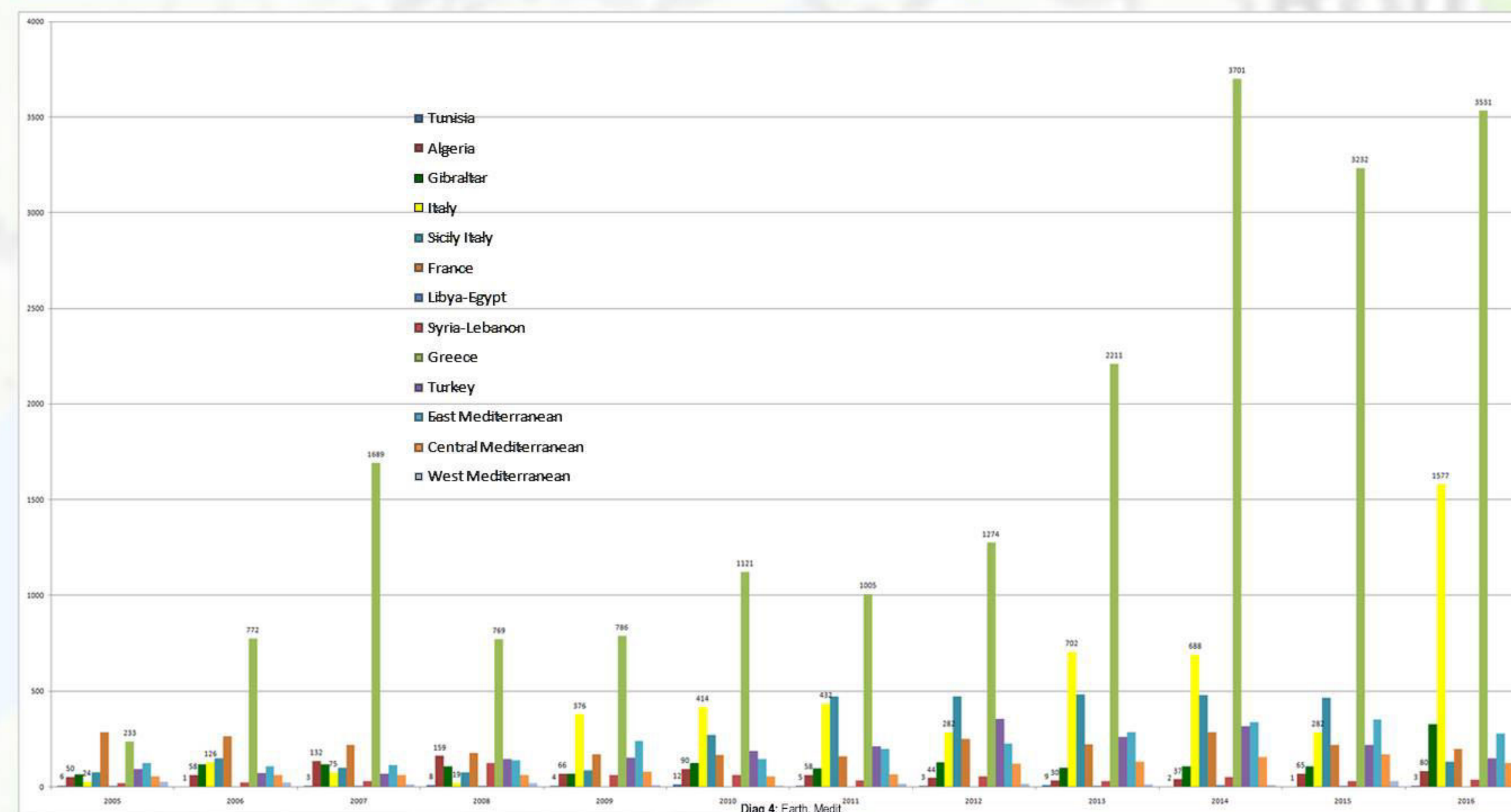


Country : Algeria
 Average : 72 earth./year
 Maximum: 159 / 2008
 Minimum : 30



Country : Italy
 Average : 416 earth./year
 Maximum: 1577 / 2016
 Minimum : 19

Seismicity statistics view (Mediterranean):



Interpretation:

- Tunisia have the lowest number of earthquakes compared first with two nearby countries (Diag1, Diag2 and Diag3) and in the Mediterranean (Diag4).
- Seismicity in Tunisia and North Algeria is clustered along alignments striking (Fig1 adn Fig2),
- Seismicity is almost absent in the segment of fold-and-thrust belt that connects Tunisia to Sicily (Fig2),

Earthquake location	Local (1<Mg<3)	No event
	Regional (3<Mg<4.5)	1095 events => 51%
	Teleseismic (4.5<Mg<9)	1036 events => 49%

Interpretation :
 KEST has better performance for detecting regional and Teleseismic earthquakes,

IMS Earthquakes	Mediterranean	Total Events : 1190 Events detected by KEST : 385 => 32% of events
	Tunisia	Total Events : 4 Events detected by KEST : 4 => 100% of events

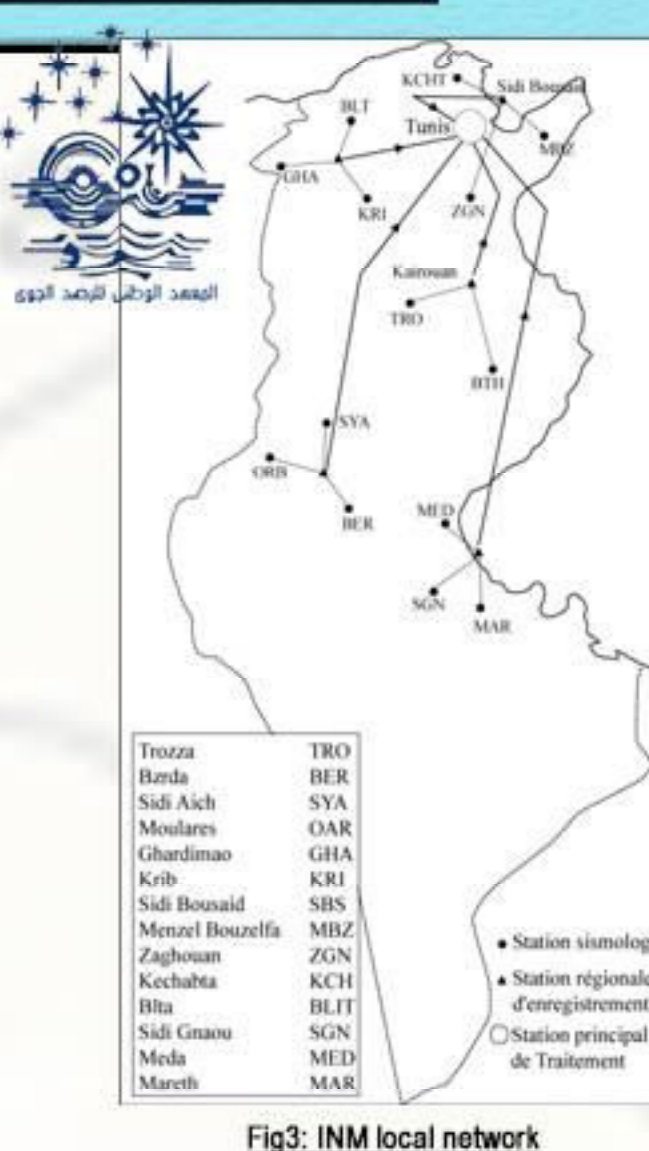
Interpretation :
 Low number of Tunisian events detected by KEST compared to the Mediterranean.

Tunisian INM local Network Statistics:

'Institut National de Meteorologie' (INM) covers many national issues: in relation with earth structures they make measurement and watch seismic activity and applied geophysical studies using a network of 25 seismic stations(Fig3).

Period of study: From 1st January to 31st December 2016,
 Station : Local Network (25 Stations),

Observations : 127 local earthquakes detected,
 The biggest with Mg = 4.7 (2 Jan. 2016)



Conclusion:

- * Local network play a major role to follow the seismic activity in the region,
- * Local network can support scientific research on understanding the earth structure and seismotectonic behaviour of the region,
- * Local network is able to improve hypocenter location capability,
- * Local network is able to improve better magnitude calculation,
- * Local network is able to improve depth resolution calculation,

Perspectives :

- How to allow IMS stations to detect Maximum of local events?
- Seek for the possibility to Include local networks detections in the processing of the IMS