Upcoming dates and locations of M≥5 seismic risk in Italy 2023-2024.

From May 2023 we enter the 365 most seismically/astronomically dangerous days for Italy since 2017. This condition is better specified in the following lines.

Major earthquakes M>5 are recorded in Italy with a recurring cyclicity of 4-8 years: there seem to be astronomical causes that contribute to this periodicity. With special graphs that take into account planetary conjunctions/oppositions seen from an Observer located in central Italy, it is possible to reconstruct "Statistical Gravitational Load" curves.

Considering when major earthquakes have occurred in Italy in the past with the same planetary conjunctions/oppositions, one obtains "bowl-shaped" curves like those shown in the article, which, when they go "uphill," indicate an inevitable increase in the frequency of earthquakes.

In these coming months we are precisely approaching one of those curve apexes again. Through statistical modeling it is then possible to estimate when in the future there will be astronomical conditions similar to those at which >M5 earthquakes have occurred in Italy.

In this article you will find - for the first time and exclusively - the calendar of M≥5 earthquake hazard days until May 2024 and maps of hazard zones until the end of 2024. In the last two and a half years we have had 20% more M≥4 earthquakes than in the previous 4 years, which unfortunately confirms the 4-8 year cycle of the resulting gravitational forces external to the Earth on our Mediterranean portion of the Earth that cause the resulting seismic triggering.

The purpose of this information is to provide a public service to citizens by providing valuable support to both the resilience of citizens residing in earthquake-prone areas and the planning of heavy load handling in shipbuilding and eventual earthquake-safe building construction.

See the ANV 2019 Video Conference in Assisi (32'), *Italy (subtitles in EN), where the gravitational model and in particular the creation of the 6-8 year Gravitational Load curve we are discussing is explained.*

More information and articles on the Gravitational Earthquake Prediction Model can be found on our ORCID profile, click HERE.

Stefano Calandra - EqForecast *Venezia, Italy, 16.05.2023*

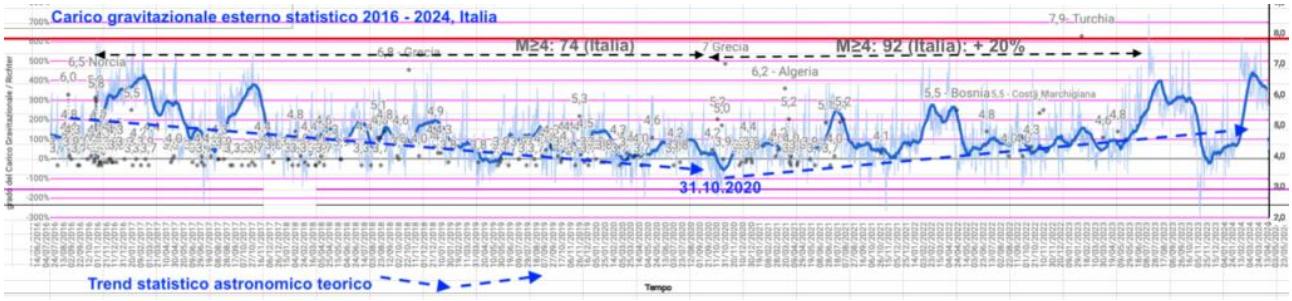
The most frequent request made to us by users is to accurately provide the location and time of the forecast of a major seismic tremor (M5+ "Greater than 5 Richter"), i.e., dangerous to humans, property and animals and in the near future in Italy.

Eqforecast is now able to provide subscribers with a **1-year seismic forecast** of potential epicenter times and locations of an M5+ (5 Richter or greater) earthquake.

We had discussed this topic before, specifically see two articles written recently, ARTICOLO 1, ARTICOLO 2.. In this article I add a few more specifics, relative to the gravity chart that I had already shown in the past for 2023 and 2024 and, most importantly, provide precise dates and instructions.

The Statistical Gravitational Load is on the rise in these months.

That broken blue line in the graphs that goes up and down in the chart below is the statistical probability that there will be a strong earthquake, estimated between 2016 and 2024. Each dot is a day, and it indicates on the left ordinate of the graph a value of "cumulative statistical probability that the same day alignments have caused a strong earthquake in the past." The right ordinate, on the other hand, shows the magnitude of the earthquakes, indicated by a black dot. Click on the graphs to enlarge them.
The blue curve has a "basin-like" pattern, peaking every 6-8 years: the last one was in 2016 (left side of the second graph), a year that in fact recorded earthquakes that we all know about; the next one is soon, **between May 2023 and June 2024 (detail in the 3rd graph).**

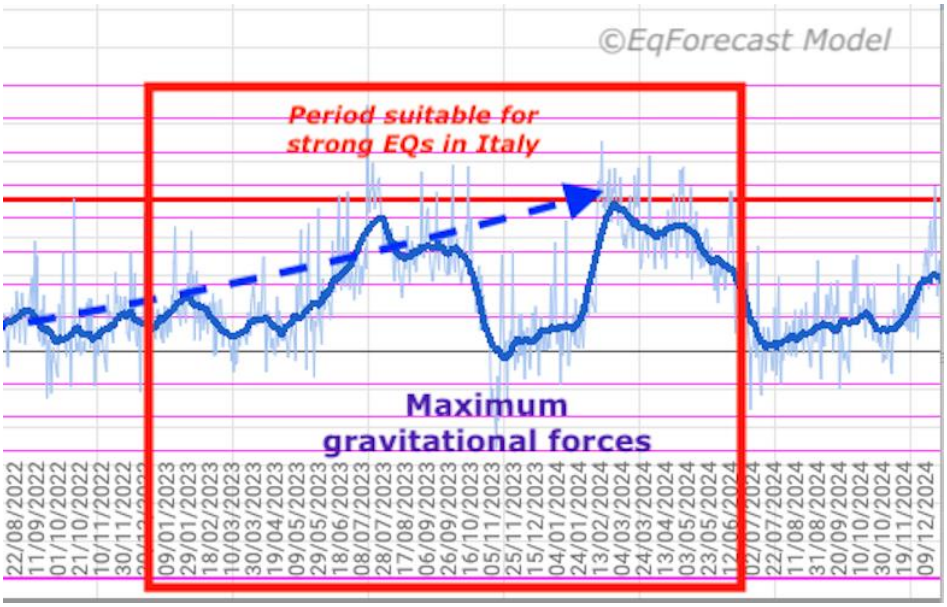


In the first graph (above, click to enlarge) we see that the blue dashed arrows indicate in the first half of the graph *a trend decrease in the gravitational load,* and in the second half of the graph *a trend increase in the same*. At the top we see that the number of ≥M4 earthquakes in Italy were in the first half of the graph equal to 74, and in the second half of the graph to date (May 13, 2023) there are already 92, **an increase of 20%.**

This trend of +20% is indicating that there is a two-way correspondence between the change in gravitational load and the actual number of higher magnitude earthquakes, and therefore we should expect at least one M5+ by June 2024 in the earth and Italy, at the right apex of the blue curve.

Strong earthquakes in Greece M7.

Note that at the point of lowest gravitational load, located in the center of the graph, corresponds a strong M7 earthquake in Greece. We had already noticed and described this behavior in a recent paper (*DOI:10.13140/RG.2.2.23605.45281*), in which I showed that every 6-8 years such an earthquake occurs, always at the same minimum gravitational load. This cyclic behavior therefore allows for its predictability.



The Calendar of M≥4.6 seismic hazard days for Italy.

This is the first time I have published such a calendar. I gladly do it for all subscribers to the SAP Pre-Earthquake Warning Service, because *"if you know it, the earthquake is not scary!"*

The usefulness of having such a calendar at your fingertips simply means that you can know well in advance what the **theoretical astronomical seismic risk (ATR) M5** days will be for 2023-2024 in Italy (no sea), **with a greater than 85% probability** that a strong earthquake event will occur on precisely one of those dates. Conversely, and **very low probability (<15%)** that a strong earthquake will occur outside those dates in Italy, on land.

The astronomical theoretical seismic risk (ATR), click HERE.

The total days called at risk ATR for magnitude ≥M4.6 for the next 365 days are 72, which is 19.7% of the time. This is still too large a time (1 day in every 5): but in actuality, each user will be alerted by the EqForecast app for less than 3% of the total 365 days for these magnitude ≥M4.6, because the seismograph also has to give its ARR real seismic risk sequence, to signal us that the fault has activated.

The total days called at risk ATR for magnitude ≥M5 for the next 365 days are 12, which corresponds to 3% of the time.

Thus, this schedule makes it clear which days you could theoretically expect an alert ≥M4.6 and ≥M5, knowing that outside of those days it is unlikely (<15%) to occur.

From the point of view of the reliability of this list of dates, experimentally the algorithms that identified them were able to predict the dates of more than 2000 M≥4.3 earthquakes from 1600 to the present, with an **error (missed alerts) of only 15%.**

The next ATR M≥4.6 and M≥5 seismic hazard dates for May 2023-June 2024.

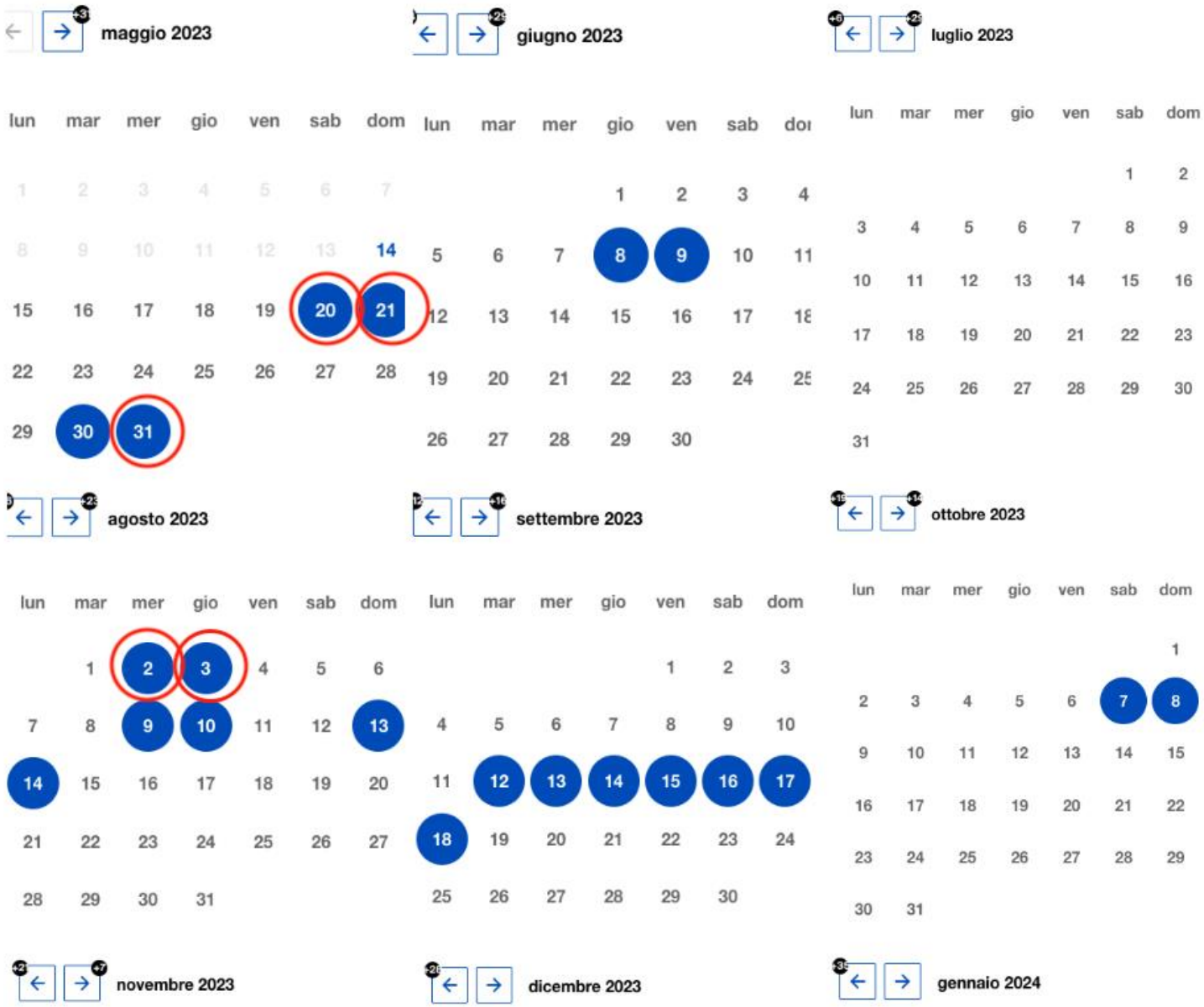
Method notes:

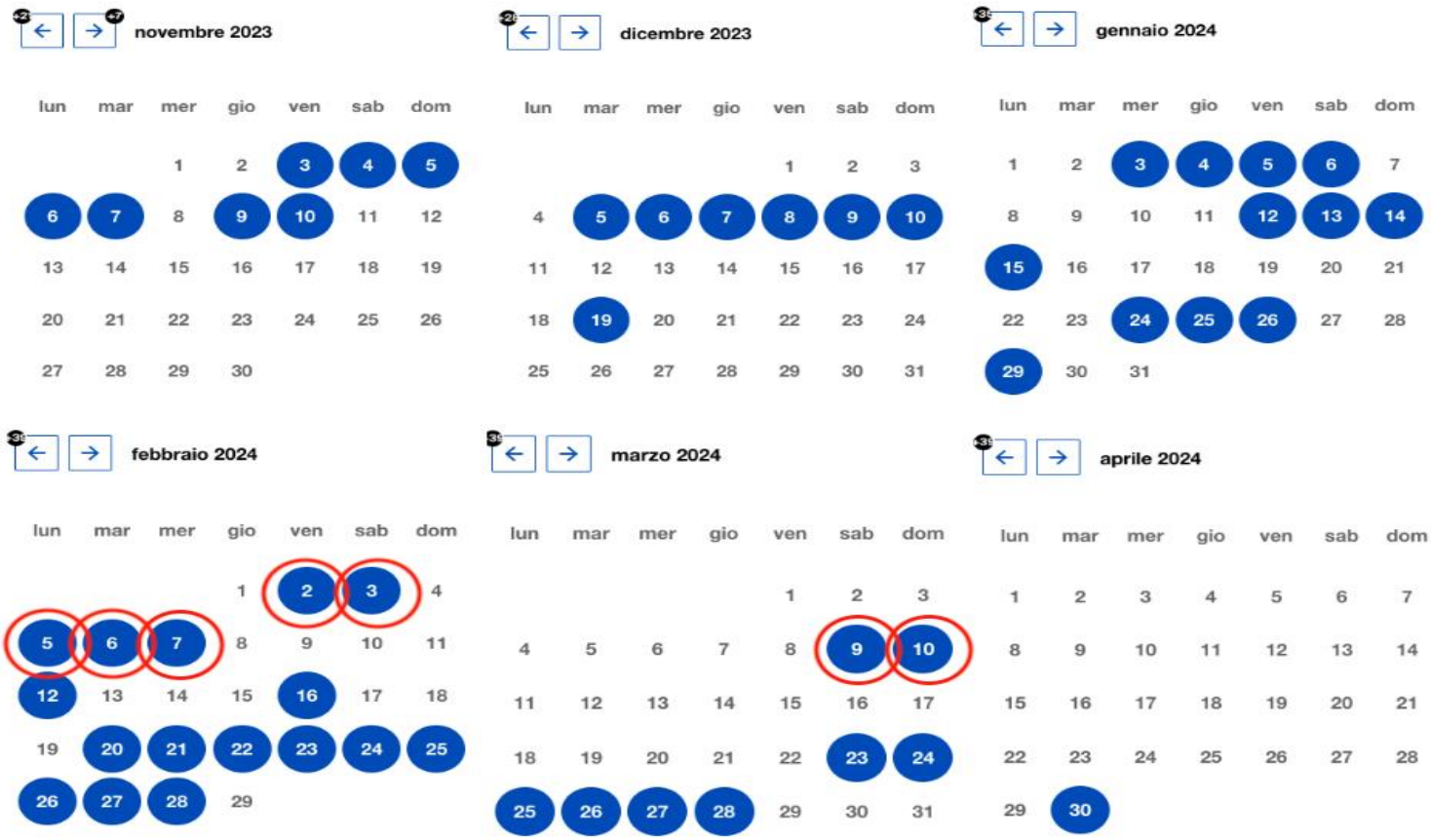
- Days with the blue dot are the dates at ATR seismic risk M≥4.6.

- The days with the blue dot edged in red are the ATR seismic risk dates with possible extension beyond M≥5.

- The months most at risk for strong earthquakes would then be May, August and February.

- The calendar covers land-based earthquakes, not volcanic eruptions.





How to read the calendar

- **This list of dates is about the theoretical ATR astronomical seismic risk for Italy in general.** It is not about the specific location of the user, who may or may not be at risk that day.
- **The calendar ATR risk will then have to be validated by the Timeline:** go to Menu--> Timeline of the EqForecast App to see the magnitude and actual times of risk for a specific day. The Timeline is always visible from 1 to 15 days from the time of viewing.
- **To know if your area is at risk that day**: learn in this article (click HERE) about the magnitude called for your location, the remaining time of seismic risk, and whether your location appears among those at seismic risk.
- **Only a few hours among those days will be at real seismic risk (ARR)** for the individual user, the SAP will tell us via the EqForecast APP, which will detect the data from the INGV seismograph which will provide the alert sequence and warn all subscribed users who reside around the epicenter area.

i *The astronomical real seismic risk (ARR), click HERE.*

The 3 indicators of seismic risk

The three indicators that the App gives us to give us the real Earthquake Risk ARR are (see figures):

- 1 - The red light.
- 2 - The remaining timer of the seismic alert.
- 3 - The maximum expected magnitude.

The percentage of time at risk **M≥4.6** will decrease further. As I mentioned above this theoretical percentage of 19.7% becomes real for less than about 3% of a person's lifetime.

The percentage of time at risk **M≥5** will still decrease. As I mentioned above its theoretical percentage of 3% becomes real for less than about 3% of a person's lifetime.

In very practical terms, to say that *"the user will be alerted by the EqForecast app for less than 3 percent of the total 365 days,"* boils down to the idea *that "I'm going to sleep in my car"* for less than 11 days in this coming year.

Seismic risk locations

The user of the Pre-Seismic Alert Service has 3 different time orders to know the locations at seismic risk:

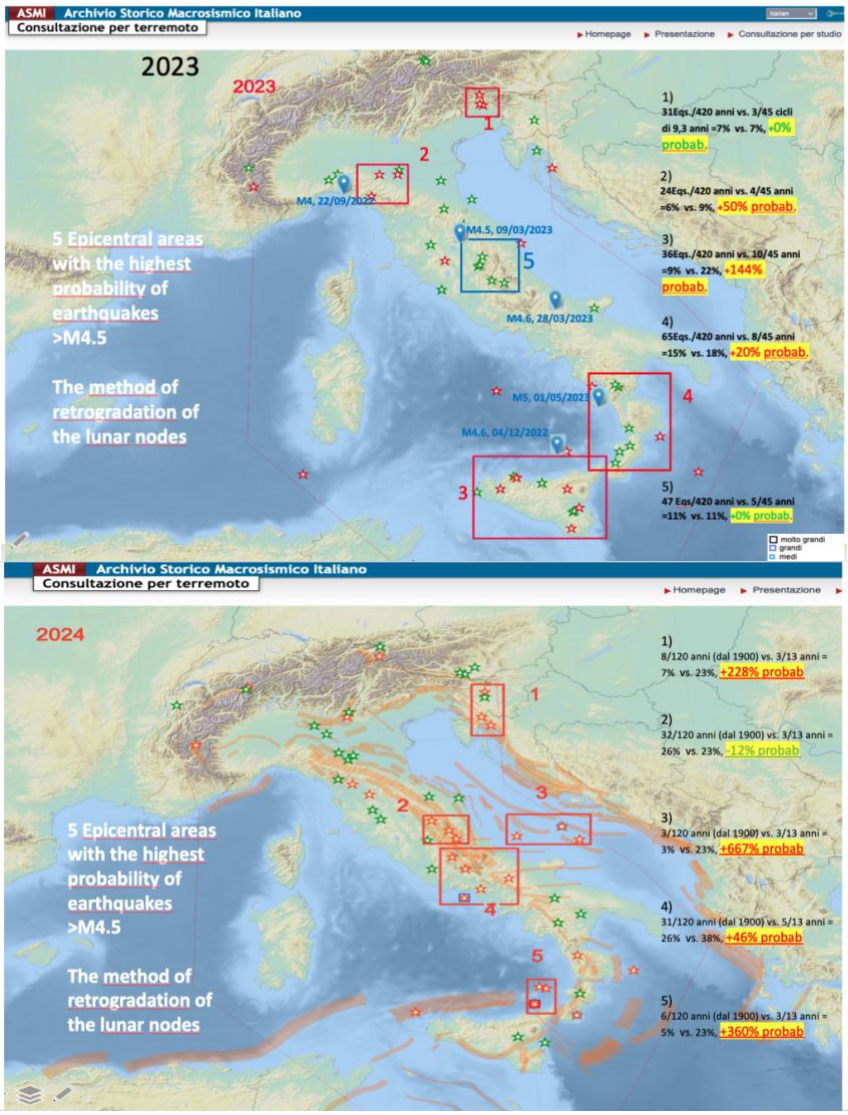
Medium Term (2-3 years)

Short Term (6 hours)

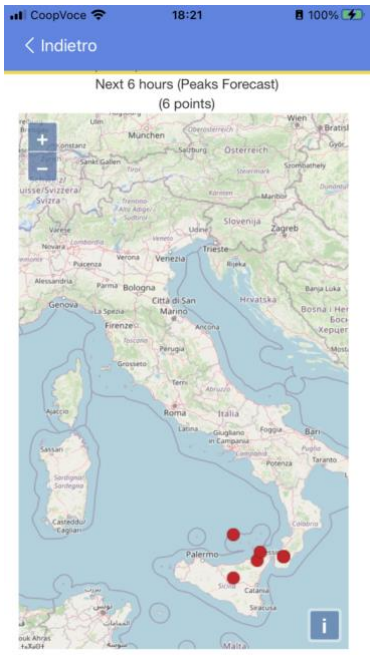
Real Time

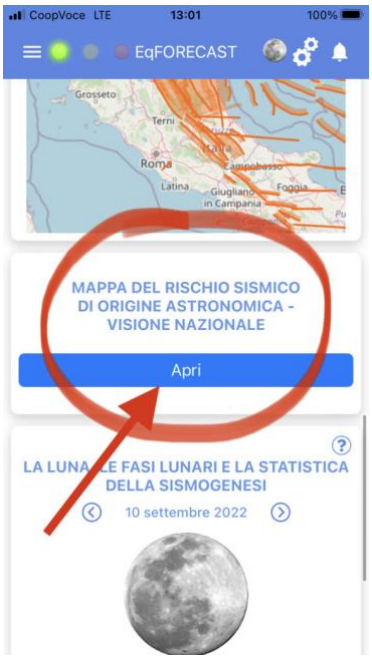
Medium-term seismic forecasts

The Medium Term SAP **allows the construction of annual epicenter maps of M5+ earthquake risk and theoretical long-term astronomical risk calendars.** The model for constructing future years' earthquake risk maps is that of lunar node precession, see DOI: *10.13140/RG.2.2.16867.02088*. These below are the M4.5+ seismic hazard maps for 2023 and 2024.



Short-Term Seismic Forecasts (6 hours)





The map of earthquake-prone locations for the next 6 hours, marked by a red dot ● is on the home page of the SAP Service's Eqforecast app. It is the *"national view" map* that you find on the home page of the app, for PRO subscribers.

Real Time Seismic Forecasting

The SAP sends pre-earthquake alerts in *real time* to users subscribed to the EqForecast APP within 19 hours before the expected earthquake. Users can choose which magnitude and locations to be pre-alerted for.

Users subscribed to the SAP of the EqForecast app receive a**n audible notification on their cell phones from a few hours to a few minutes BEFORE the earthquake** if the location(s) set is at earthquake risk, with an indication of the expected maximum magnitude and the time of the earthquake risk: if the location set is at earthquake risk, the user will see the location in the app home - both as text and as a point on the "User View" map - with the red traffic light signal placed in the upper left corner of the app home.

i **Insight into the seismic prediction of the SAP, click HERE.**

Sincerely yours.

Stefano Calandra - © EqForecast