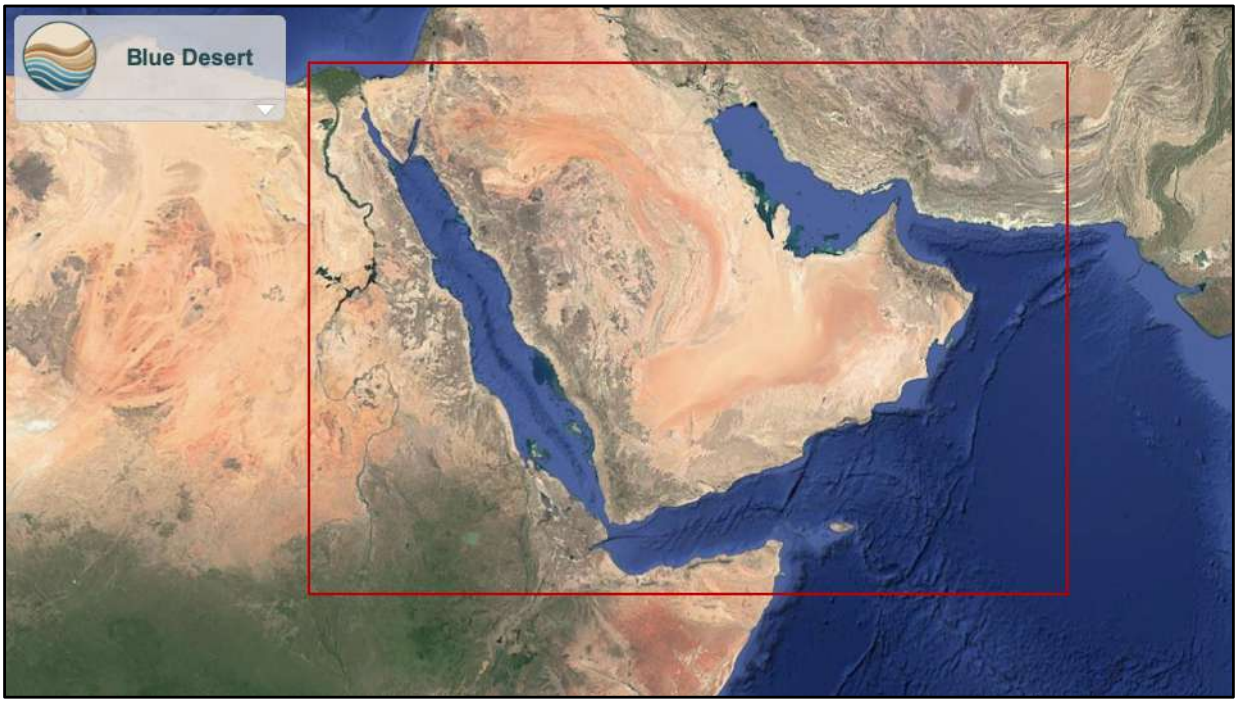
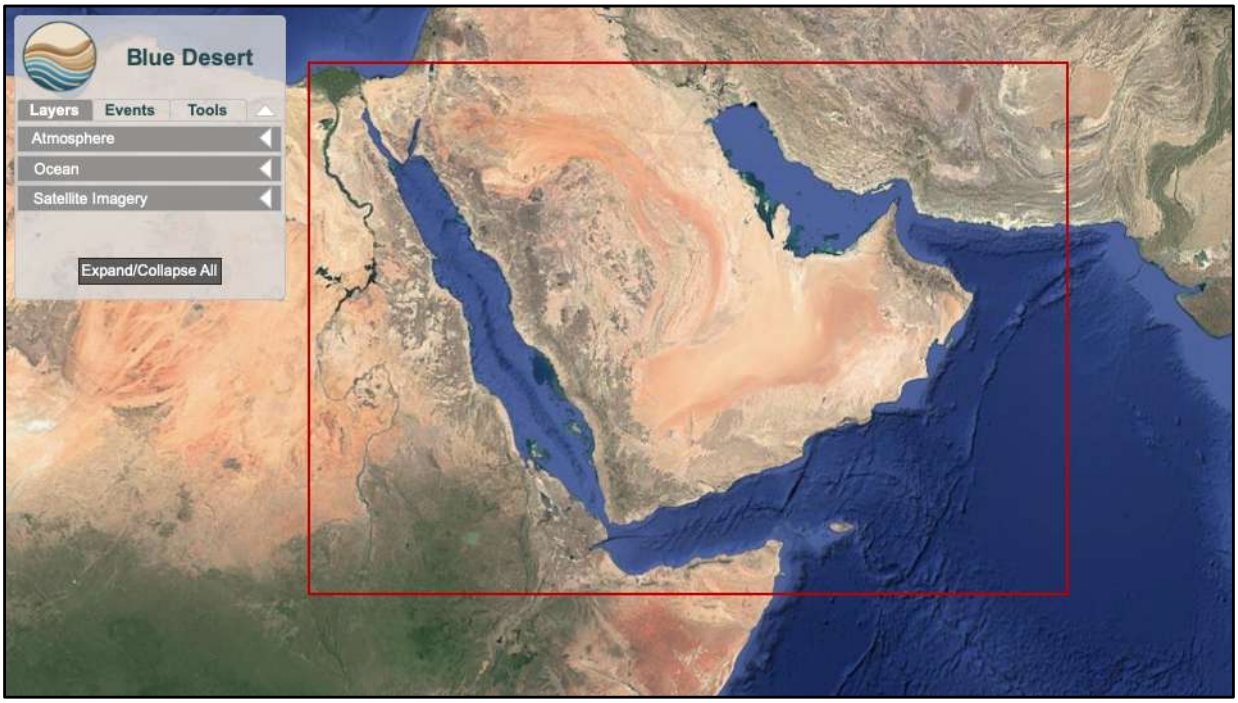


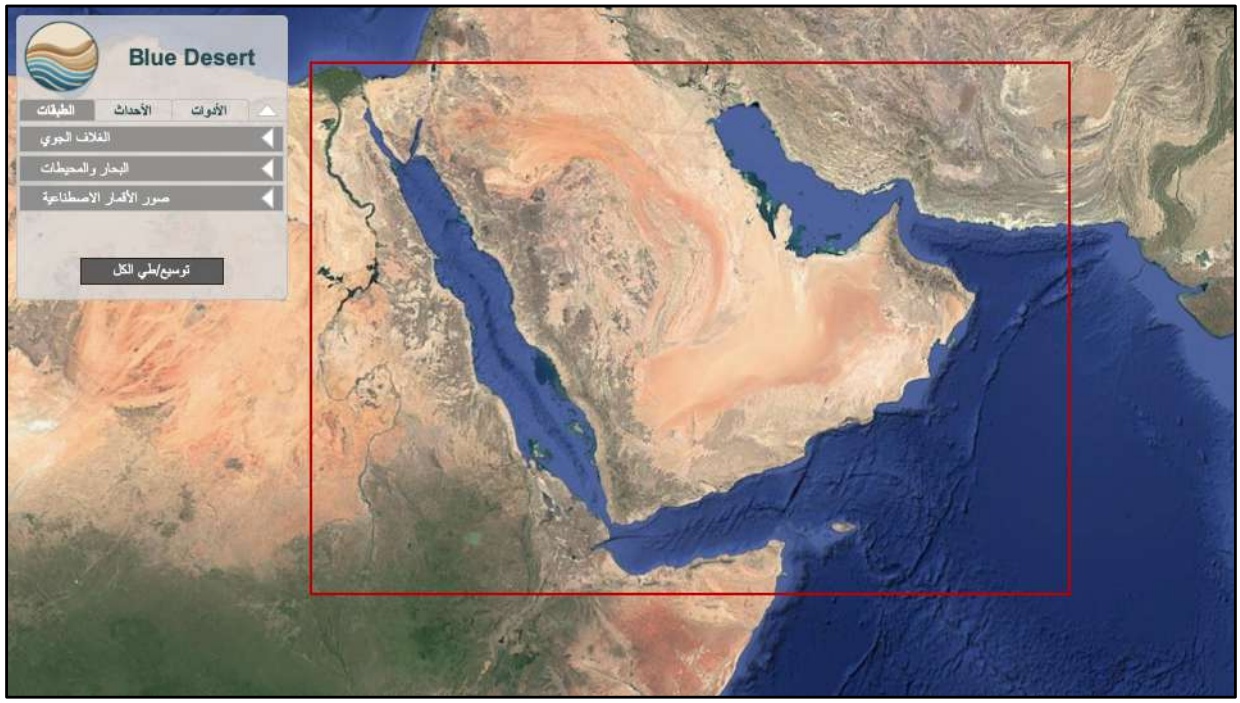
Upon registration (with an organization email address and password), user is asked to specify an Area of Interest (AoI) for which a digital twin will be created. The AoI can be drawn (circle, rectangle, polygon) or specified as a shape file or KML/KMZ file. When a user accesses their account, the basemap will be centered at their AoI.

GIS features to be included:
Basemap layers,
A ruler (for distance measurement),
A button for placing a pin on the map (to mark a location),
Show lat/lon coordinates.

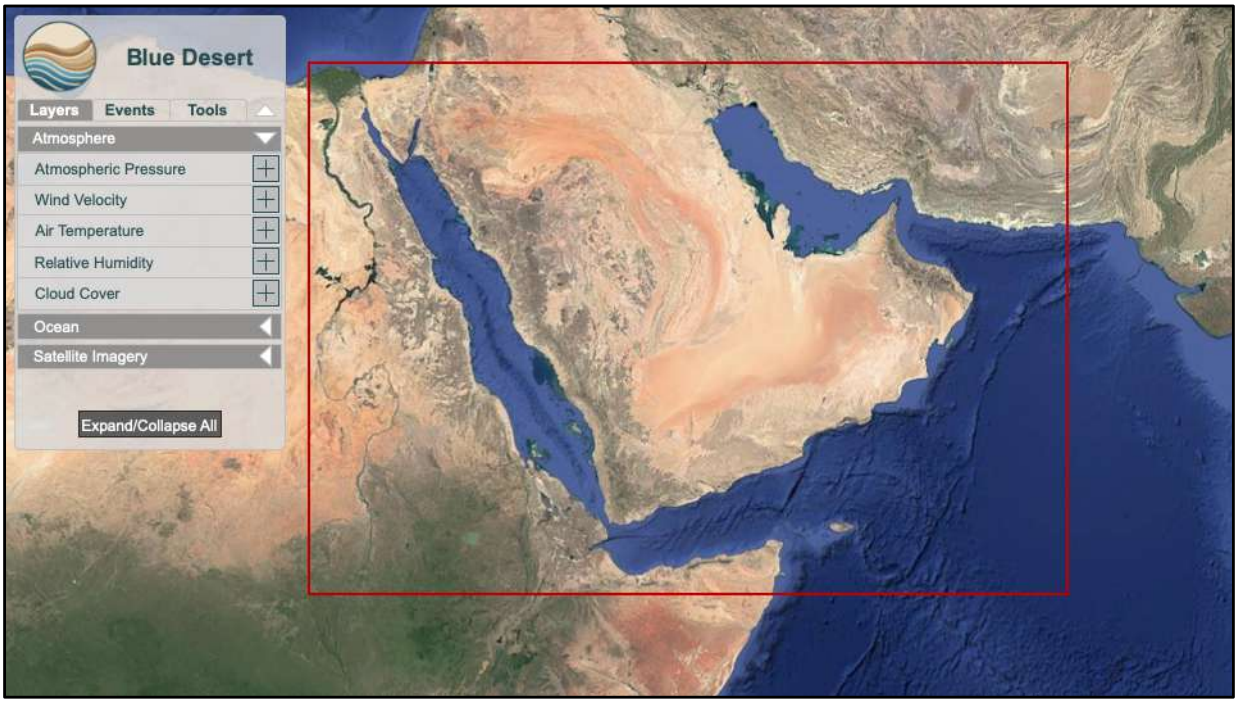


The side navigation of the platform consists of 3 tabs: Layers, Events and Tools.

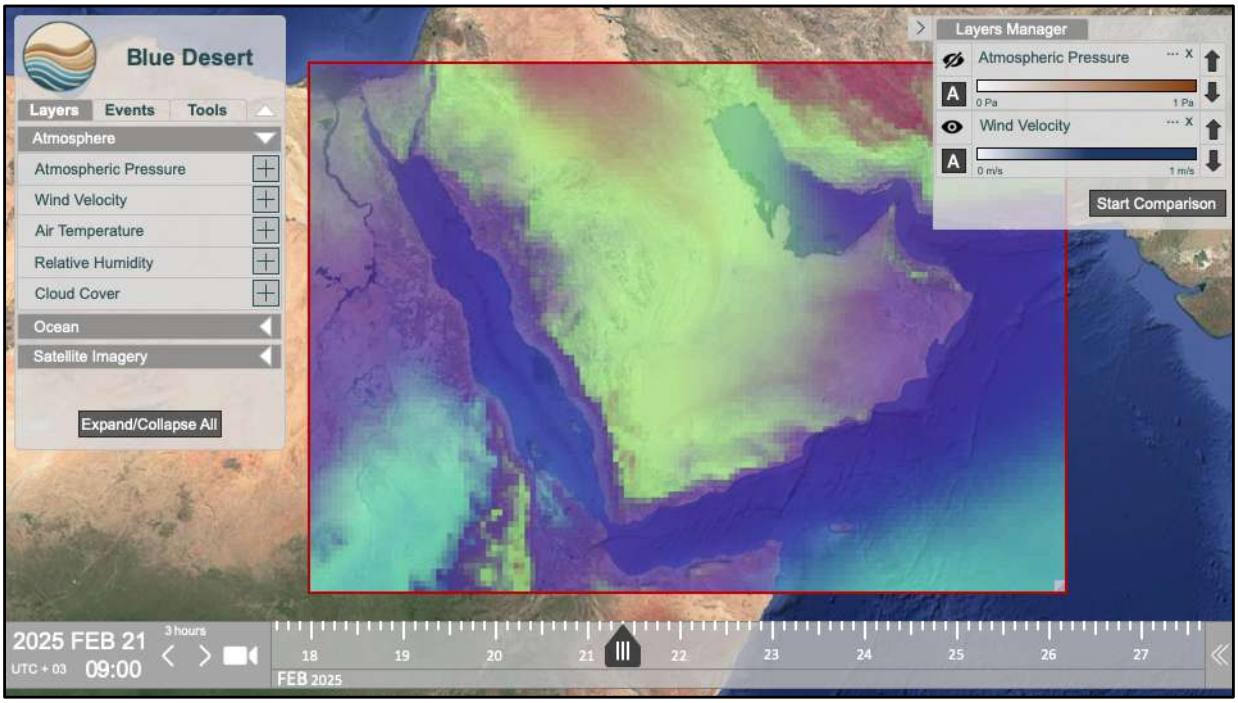
The Layers tab consists of 3 collapsible tabs: Atmosphere, Ocean and Satellite Imagery. The platform is meant to create a dynamic digital twin for each user. All data will be updated accordingly. Atmospheric and ocean data will be updated daily. Satellite imagery will be updated whenever they become available (the system will check hourly for the availability of satellite imagery). Data layers will be provided in Cloud-optimized GeoTiff (CoG) format for practical matters.



The platform should provide text in English and Arabic and the UI should be updated accordingly.

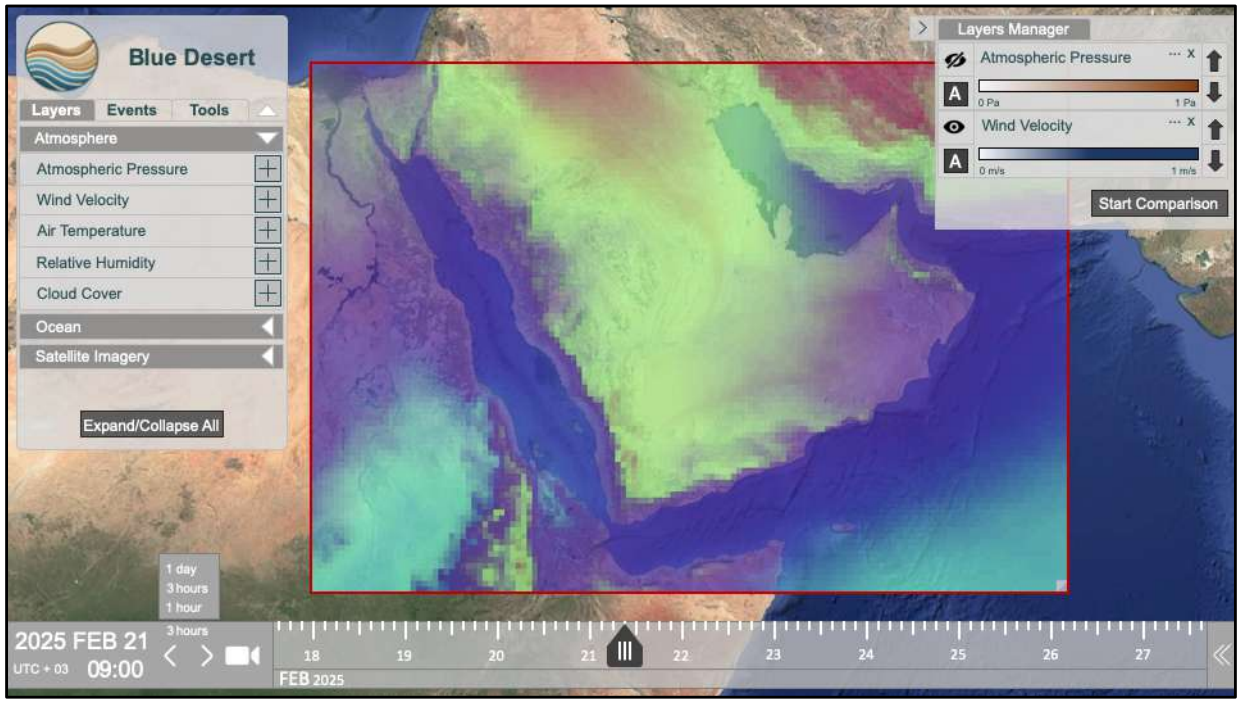


The Atmosphere tab expands to reveal various data layers: the atmospheric pressure, the wind velocity, the air temperature, the relative humidity and the cloud cover. Each layer consists of 2D time-series data that span over 15 days centered at the current date. 7 days hindcast, the current date and 7 days forecast.

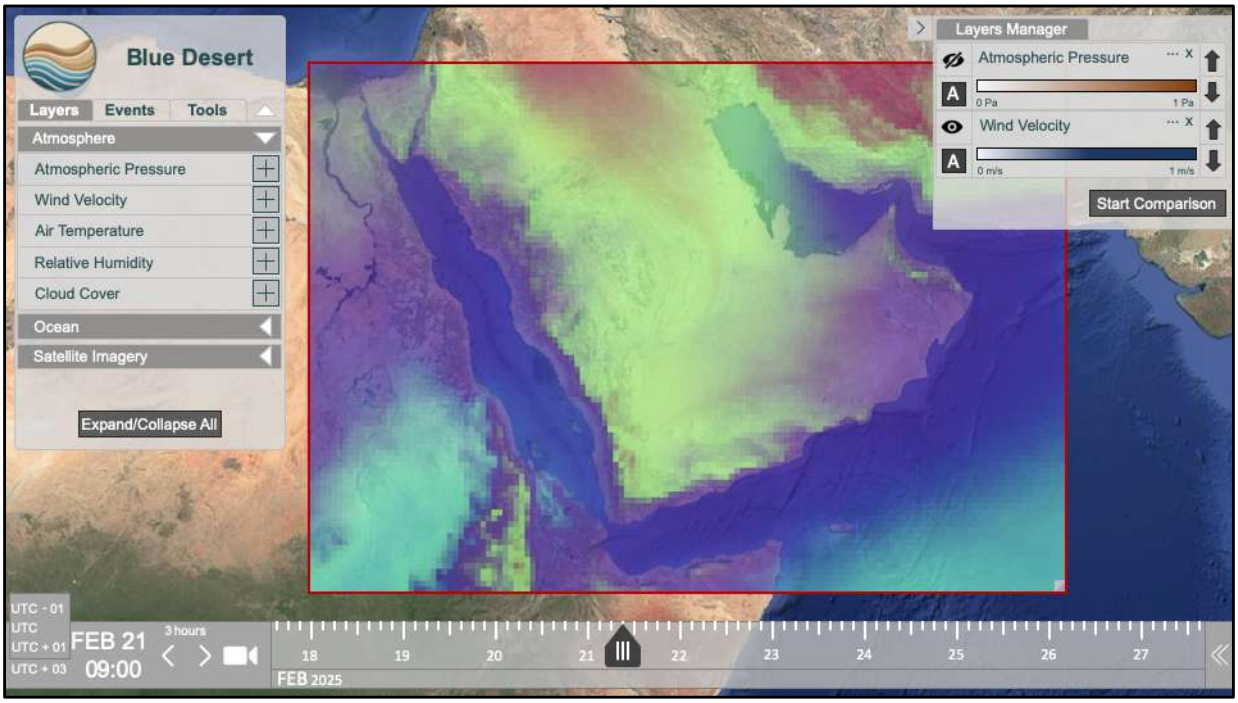


When the user clicks on the + button next to each data layer, the corresponding layer will be added to the Layers Manager side navigation tab on the right, and will appear on the map (within the boundaries of the AoI). In this example, two layers have been added to the Layers Managers tab: the atmospheric pressure and the wind velocity. The user can choose to show/hide any layer and control the order by which the layers appear on the map by moving them up or down in the Layers Managers tab. Each layer in the Layers Manager tab will show a color bar whose bounds are the min and max values of the data over 15 days (hindcast + forecast).

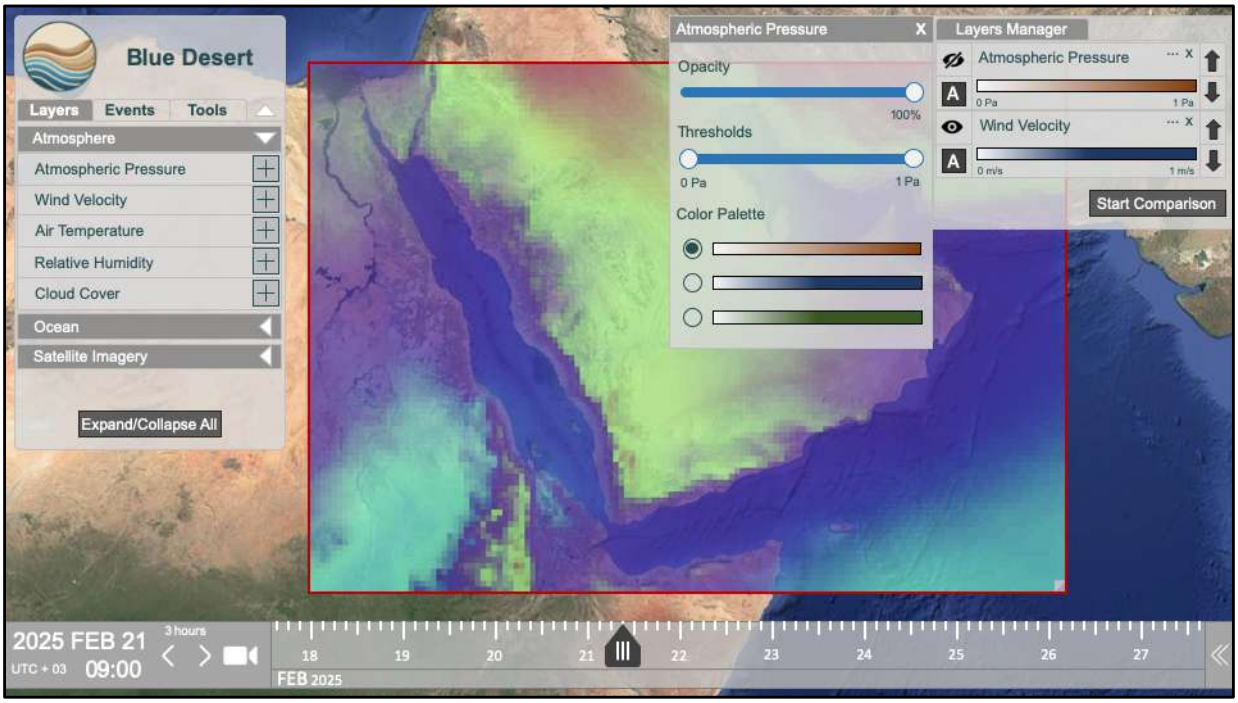
The timeline at the bottom of the screen appears whenever time-series data are added to the Layers Manager tab, and allows users to visualize the time-series data at a specific date and time, by either sliding the slider along the timeline or pressing the left and right arrows to change the date and time incrementally.



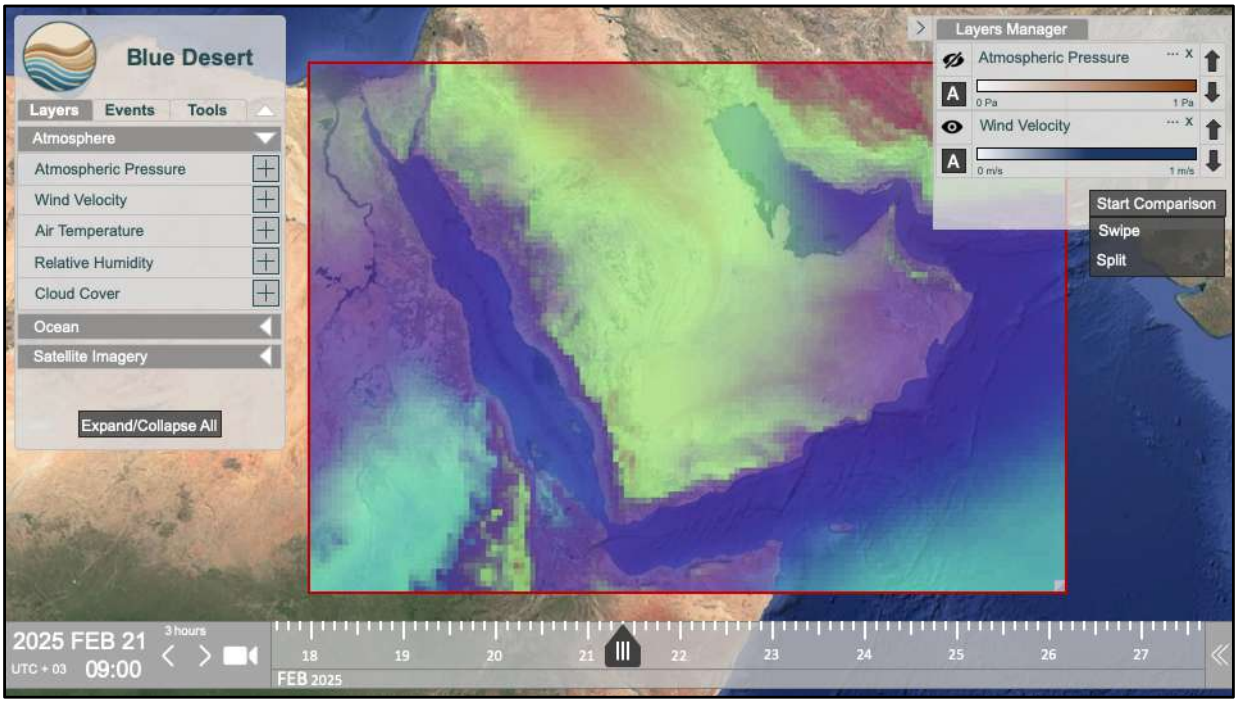
The user can choose from a list the step/increment (1 hour, 3 hours or 1 day) by which the date and time will increase or decrease when pressing the right and left arrows, respectively.



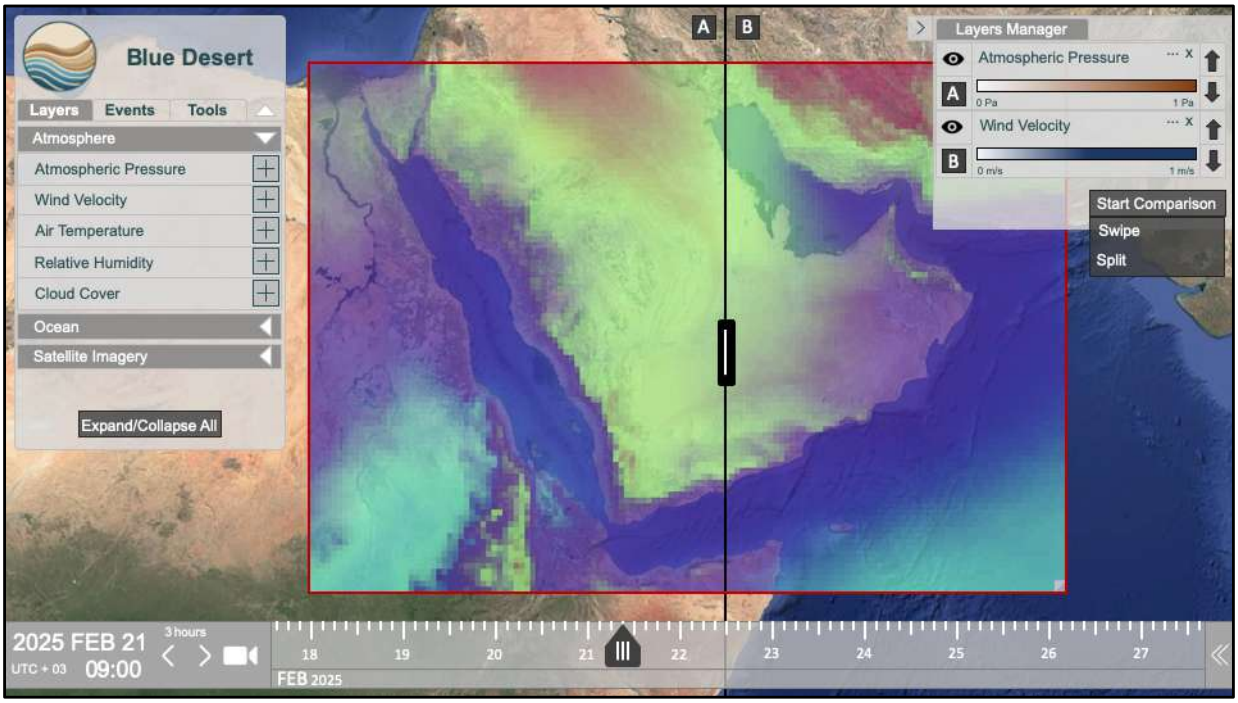
The user can also specify from a list the time zone of their preference (might consider moving the time zone bottom to the top of the screen to make it global and accessible across all pages). All date and time will be shown in the user-defined time zone. Note that all data are provided in UTC and a necessary conversion should be applied to reflect the time zone change in the UI.



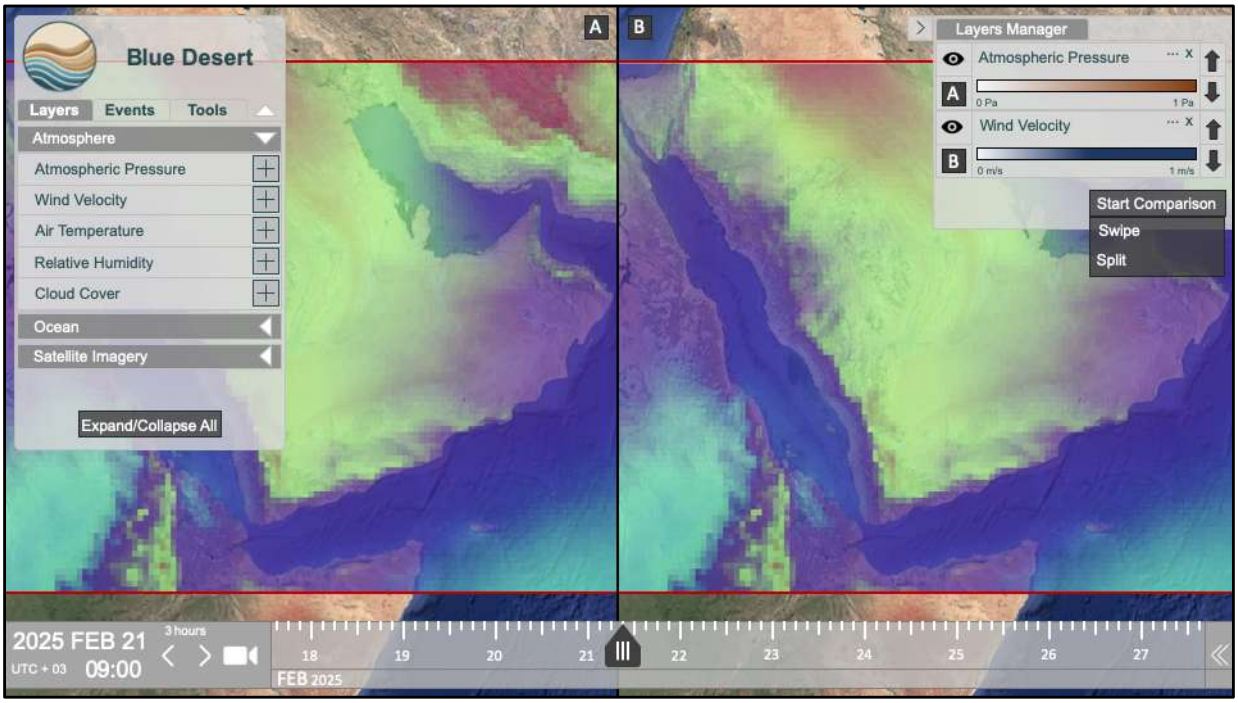
Layers in the Layers Manager tab can be removed from the tab by clicking on the x (Remove Layer) button. The … (View Options) button allows users to control the settings of the corresponding layer such as setting the layer's opacity, changing the min and max thresholds of the data values, and choosing a color palette from a list of options.



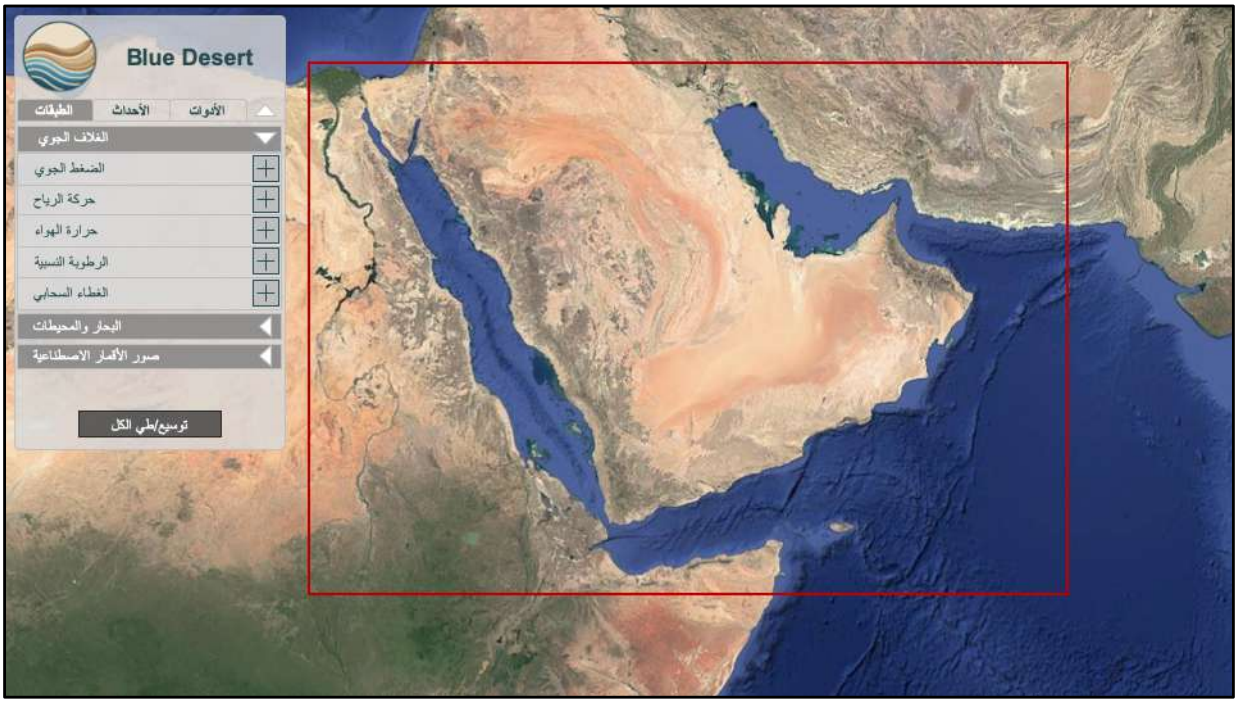
The Start Comparison button in the Layers Manager tab allows users to compare two or more data layers in two modes: Swipe and Split. In both modes, the user can select on which side (left > A, right > B) of the dividing line a given layer will appear by selecting A or B via the toggle button corresponding to that layer.



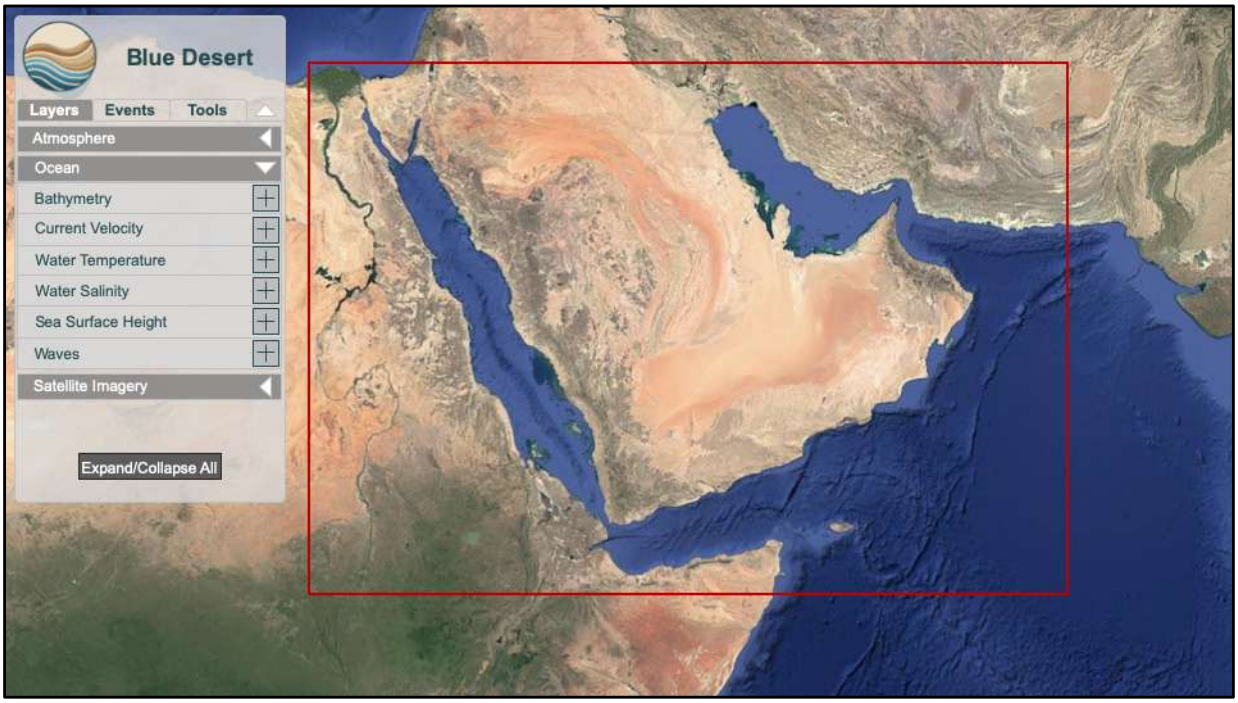
The swipe mode…



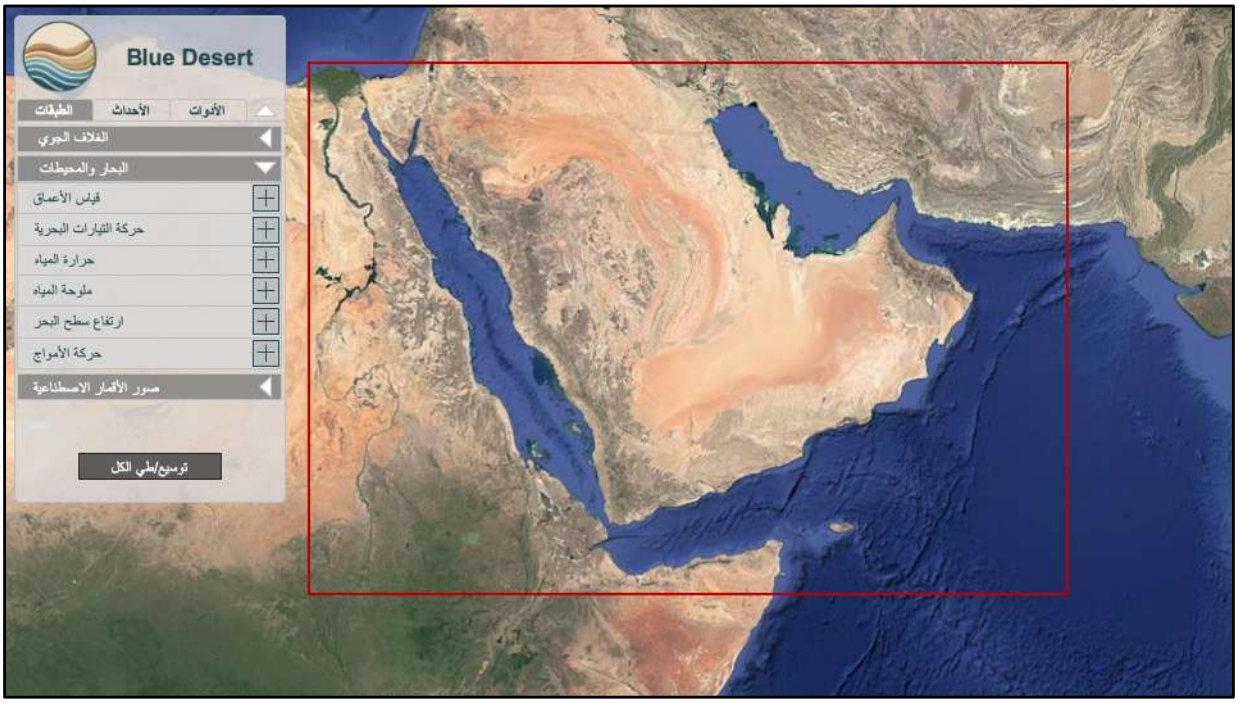
The spilt mode…



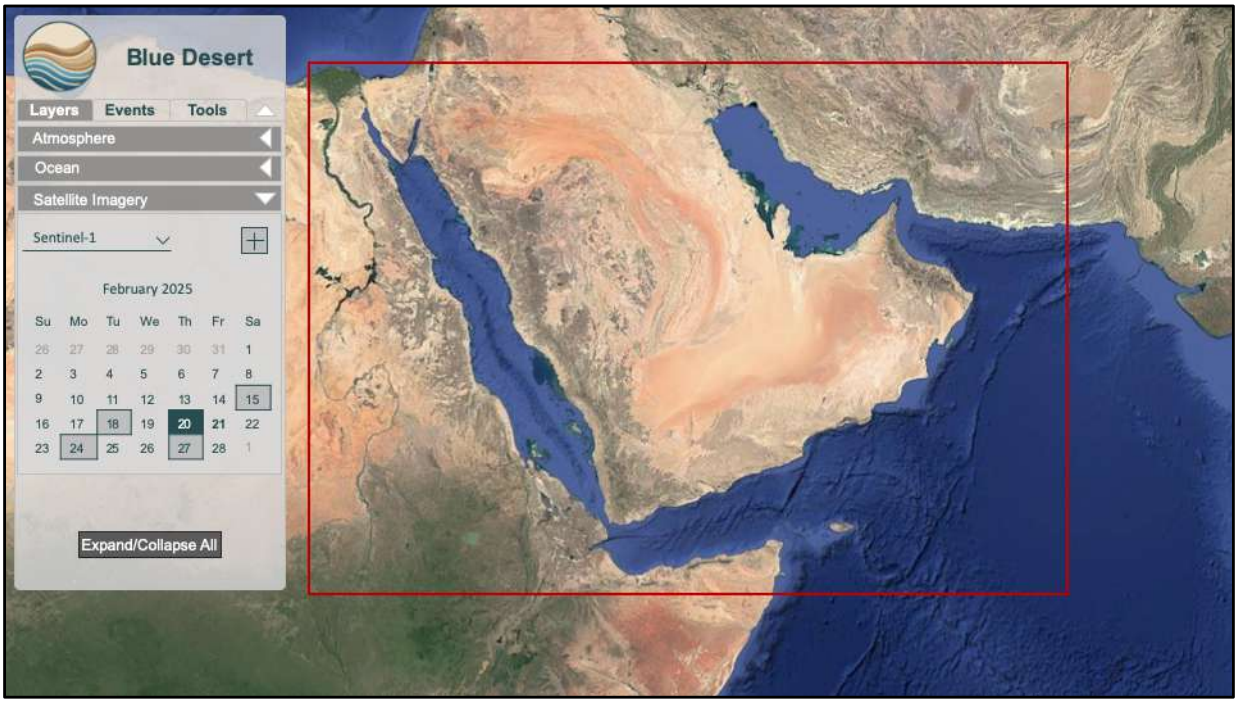
The Arabic version of the Atmosphere layers.



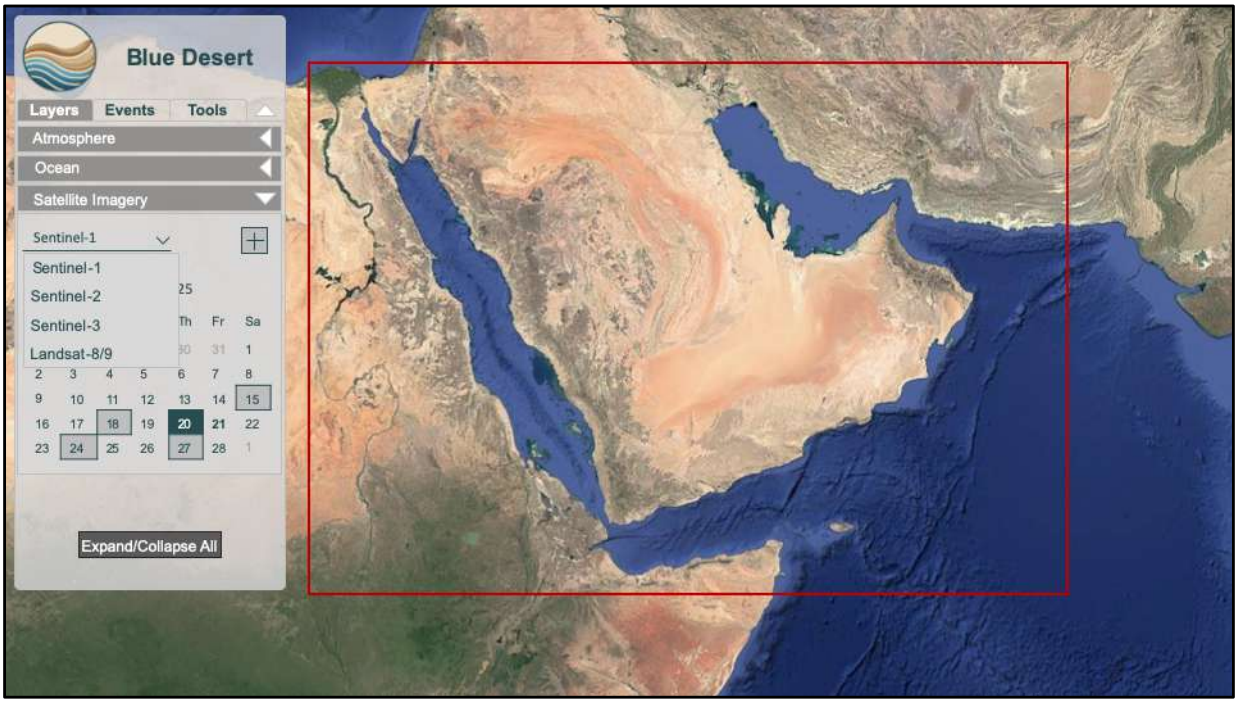
The Ocean tab expands to reveal various data layers: the bathymetry, the current velocity, the water temperature, the water salinity, the sea surface height and waves. Each layer (except for bathymetry) consists of 2D time-series data that span over 15 days centered at the current date. 7 days hindcast, the current date and 7 days forecast.



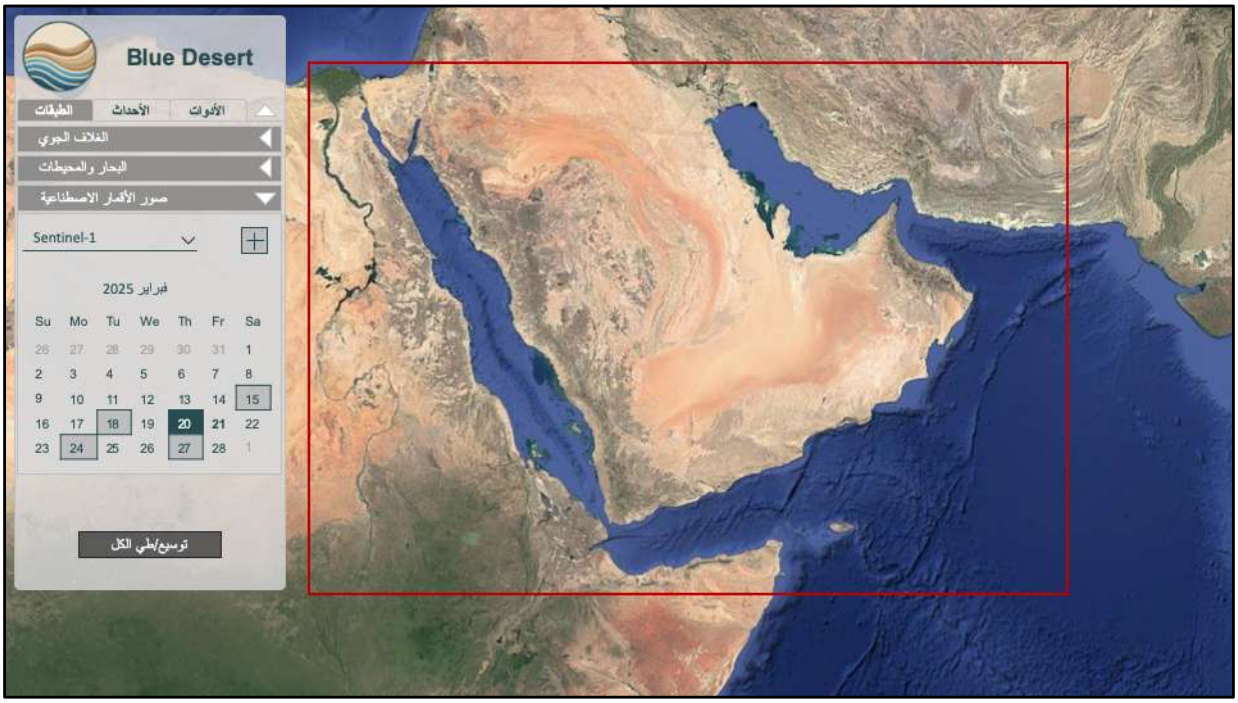
The Arabic version of the Ocean layers.



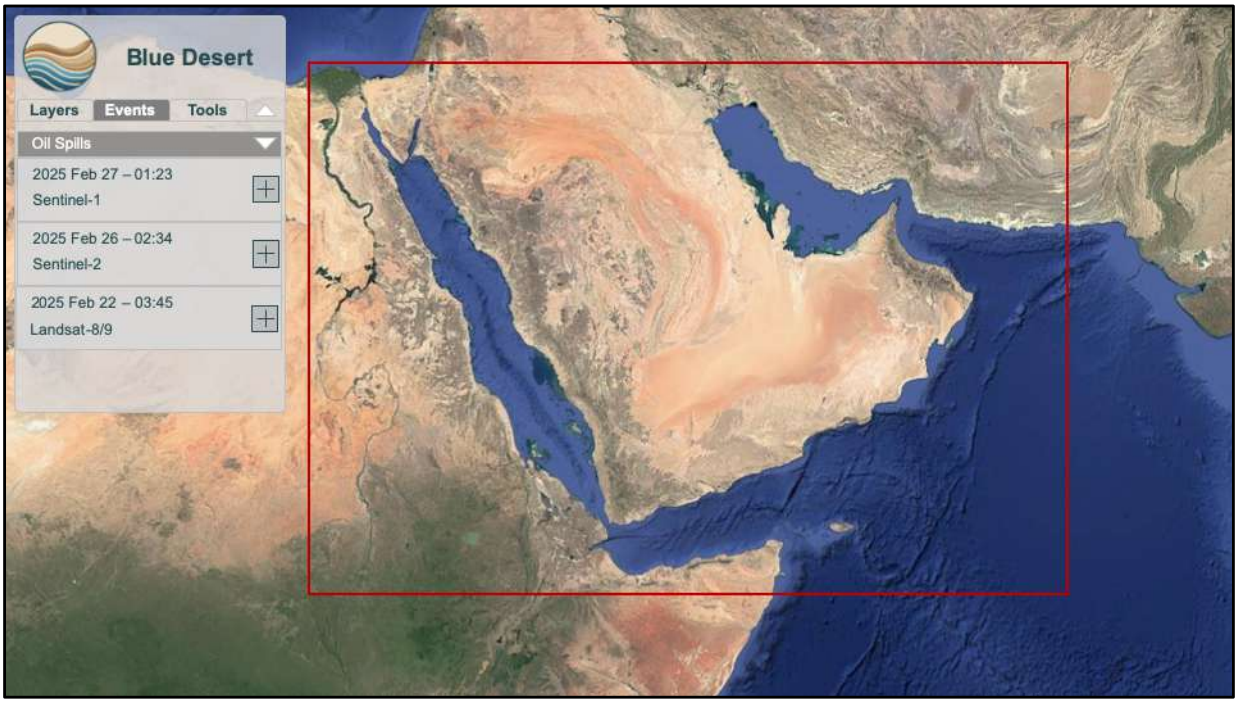
The Satellite Imagery tab expands to reveal a drop down menu from which users select a satellite mission, and a calendar that shows when satellite imagery corresponding to the selected mission is available. The calendar shows imagery availability over 15 days centered at the current date. Assuming current date is 21 February 2025, the calendar shows imagery availability between 14 and 28 February 2025. By clicking on a date prior to the current date when imagery is available (e.g., 20 February 2025), the corresponding satellite imagery is overlayed on the map along its bounding box. By clicking on a date after the current date (e.g., 24 February 2025), the bounding box of the corresponding satellite imagery that will become available at that date is overlayed on the map. By clicking on the + button, the selected imagery and/or its bounding box will be added to the Layers Manager tab.



The satellite missions in the drop down menu are: Sentinel-1, Sentinel-2, Sentinel-3 and Landsat-8/9.

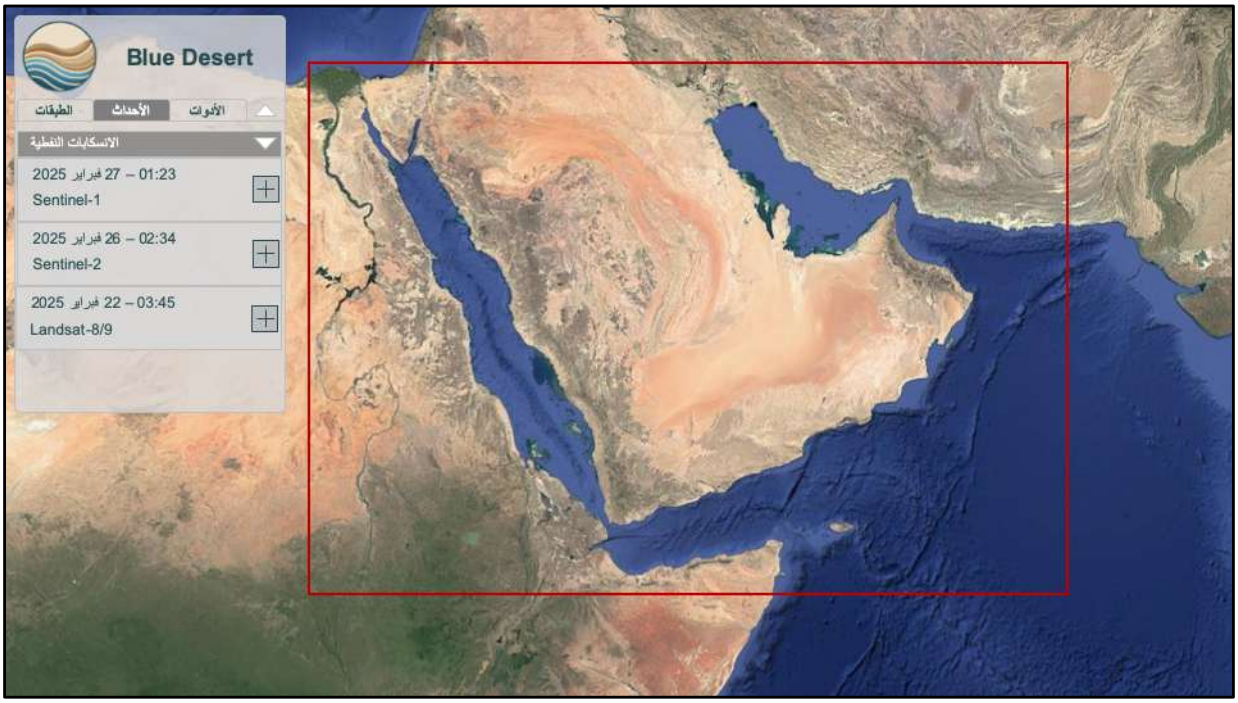


The Arabic version of the Satellite Imagery tab.

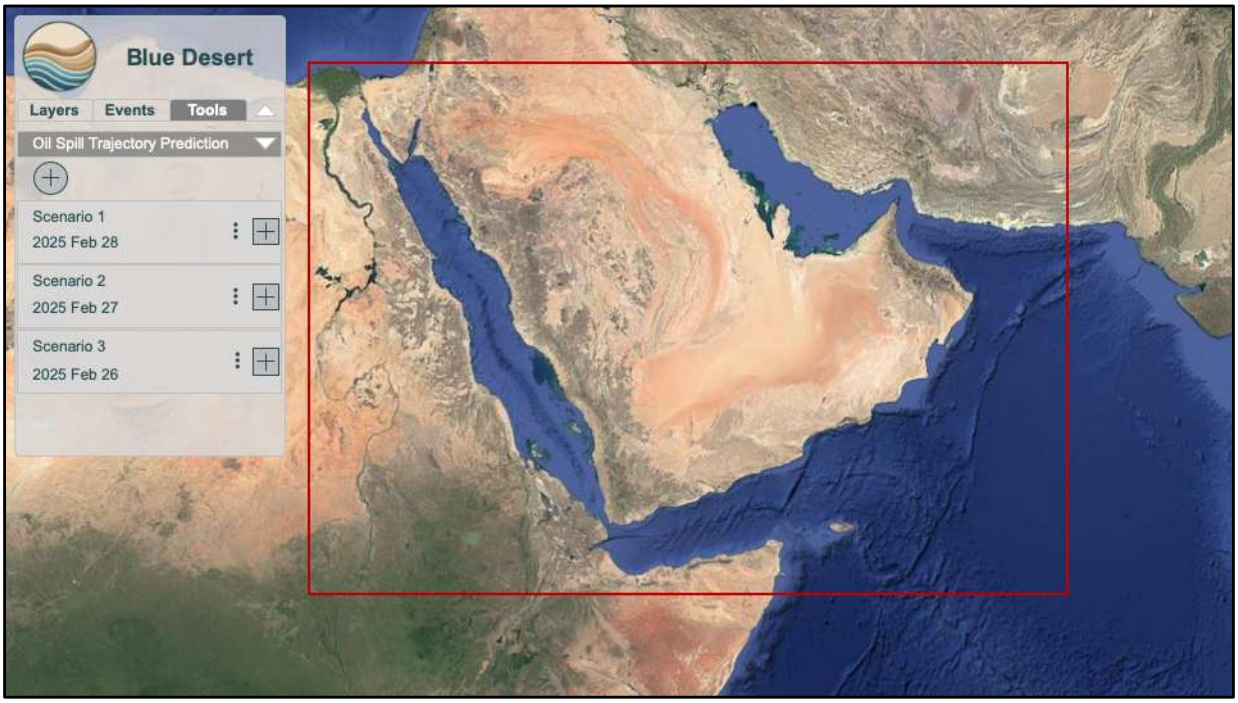


The Events tab consists of 1 collapsible tab: Oil Spills. The Oil Spills tab expands to reveal detected oil spill events. All satellite imagery are processed in the background for oil spill detection. Confirmed oil spill events appear under the Oil Spills tab. Each event consists of a satellite image in a Cloud-optimized GeoTiff (CoG) format and a KML file of a polygon representing the oil spill contour. Under the Oil Spills tab, each event is defined by the event's date (e.g., 2025 Feb 27 – 01:23) and the corresponding satellite mission (e.g., Sentinel-1). By clicking on an event, the satellite imagery of the detected event, along with the corresponding polygon are overlayed on the map. By clicking on the + button next to each event, the satellite imagery of the detected event, along with the corresponding polygon are overlayed on the map and added to the Events Manager tab.

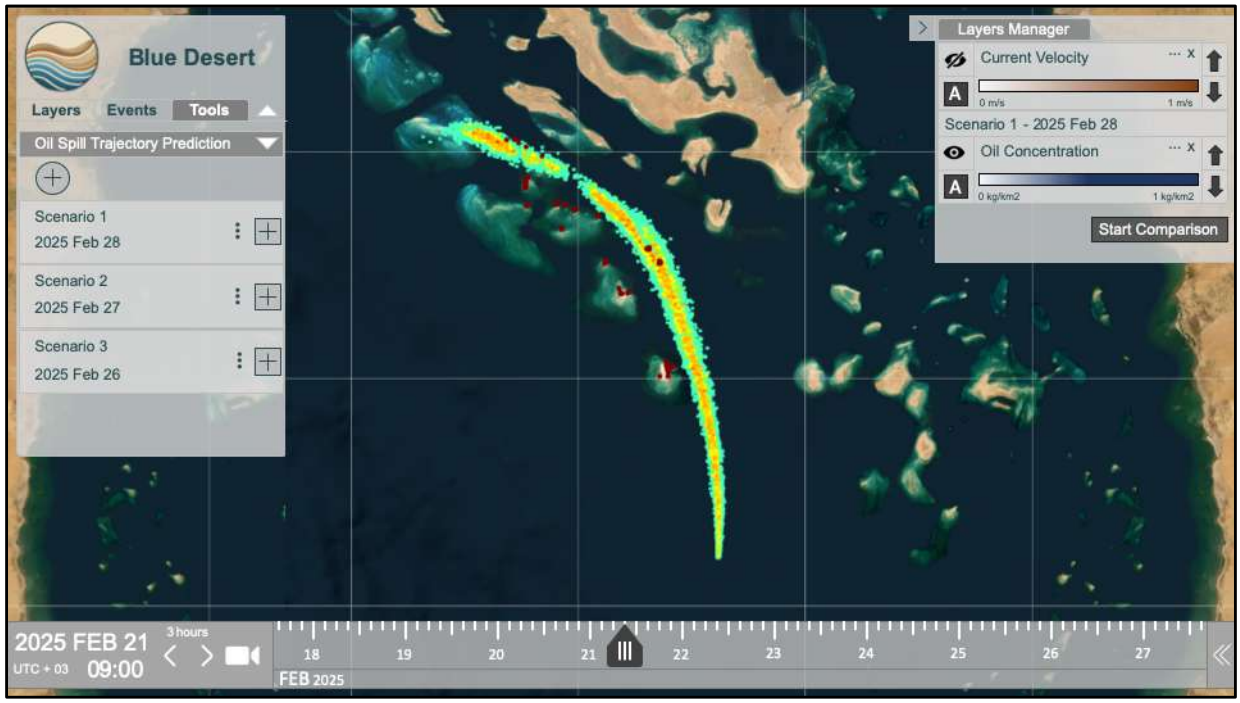
Time zone?



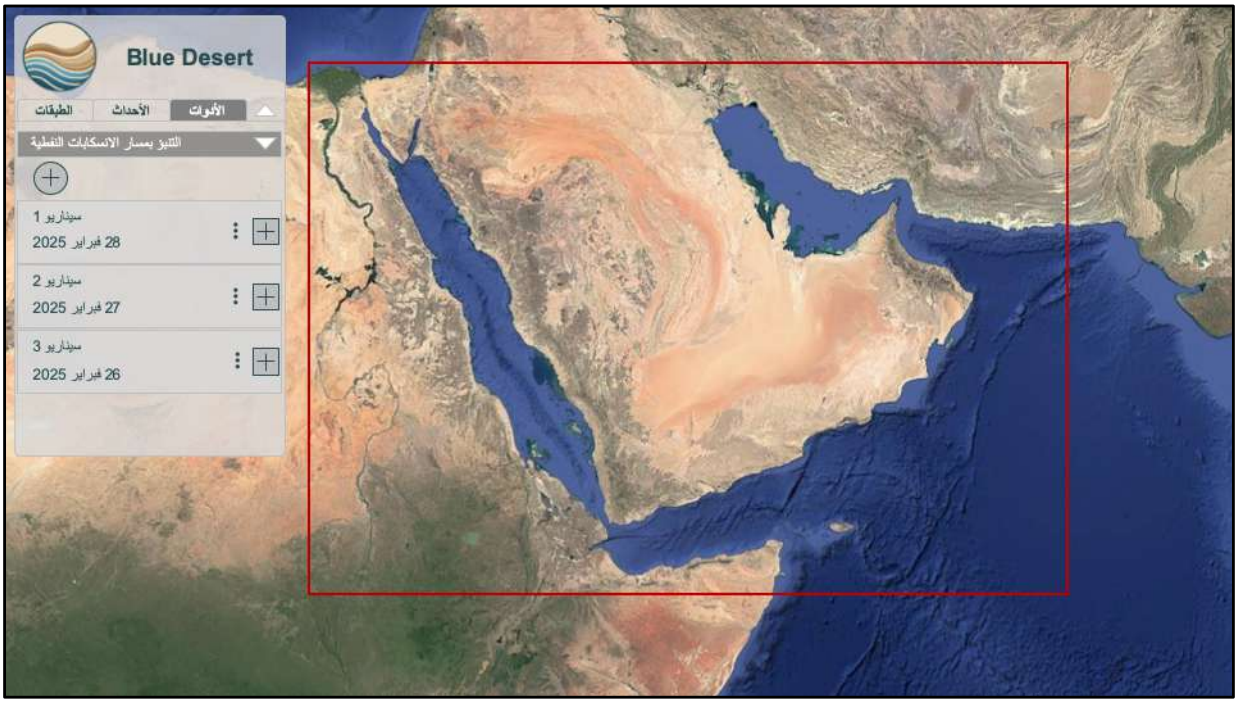
The Arabic version of the Oil Spills tab.



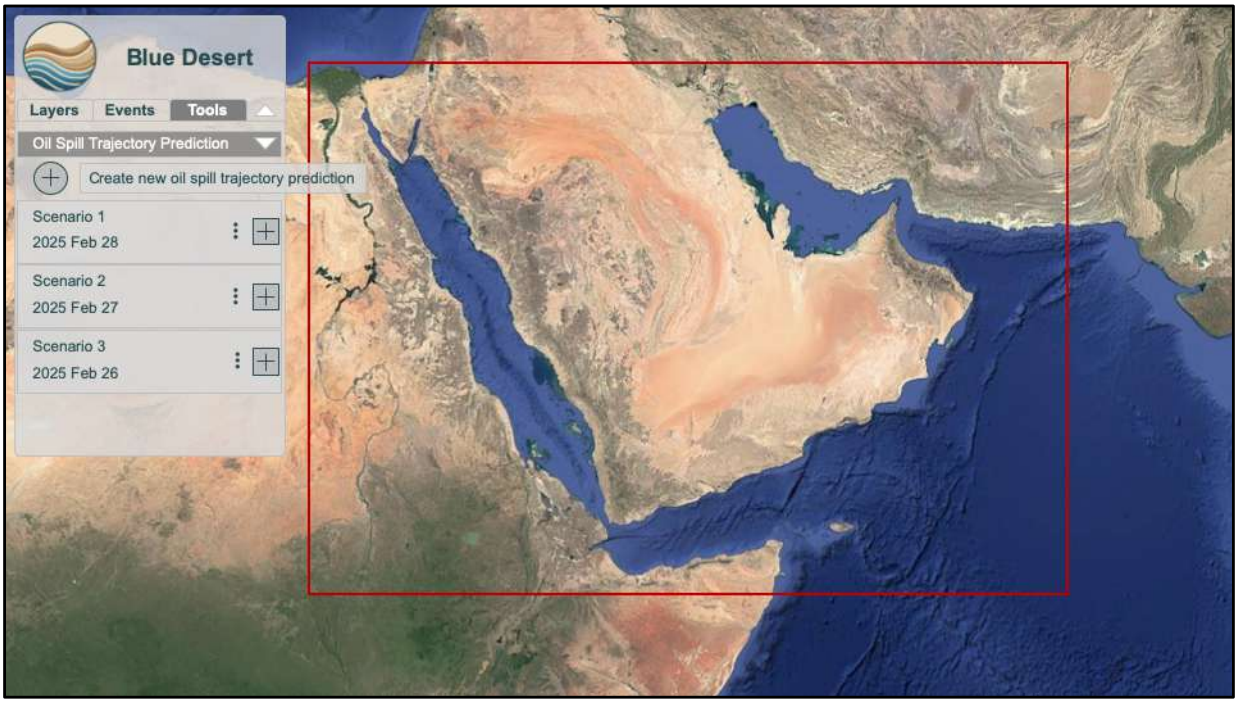
The Tools tab consists of 1 collapsible tab: Oil Spill Trajectory Prediction. The Oil Spill Trajectory Prediction tab expands to reveal the option of creating a new oil spill trajectory prediction (the round + button), along with a list of simulated time-series oil spill predictions that can be visualized and overlayed on the map.

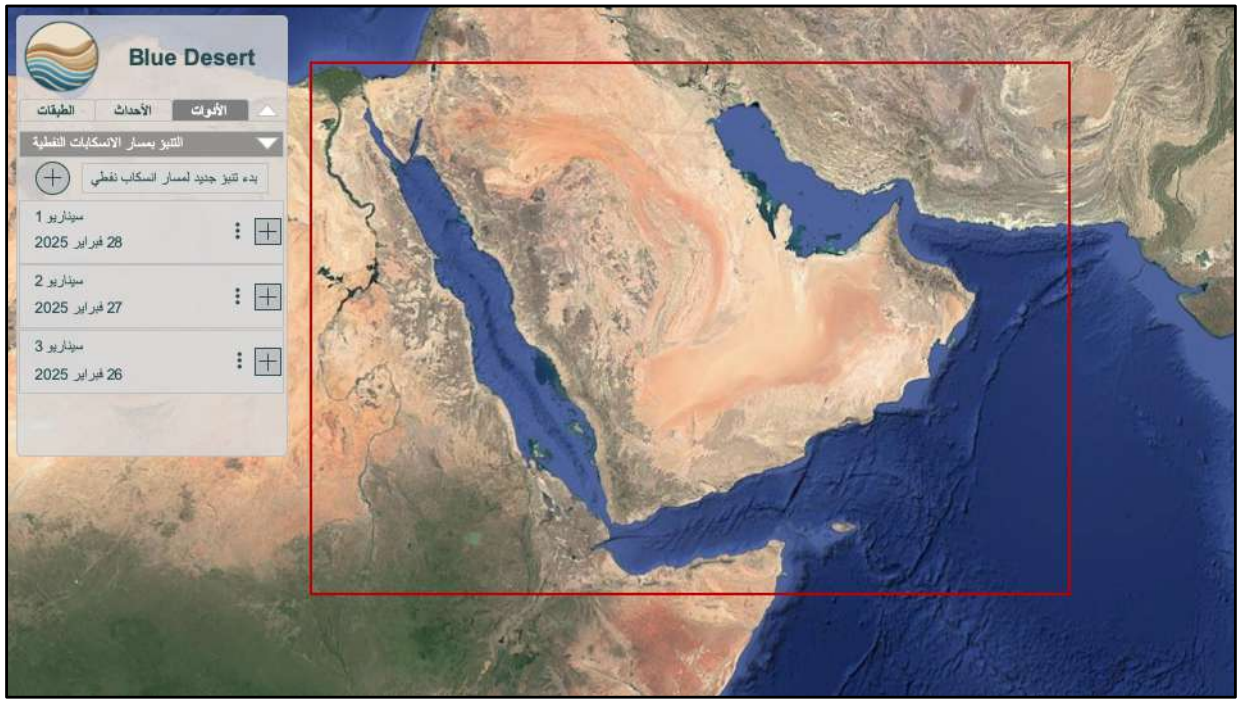


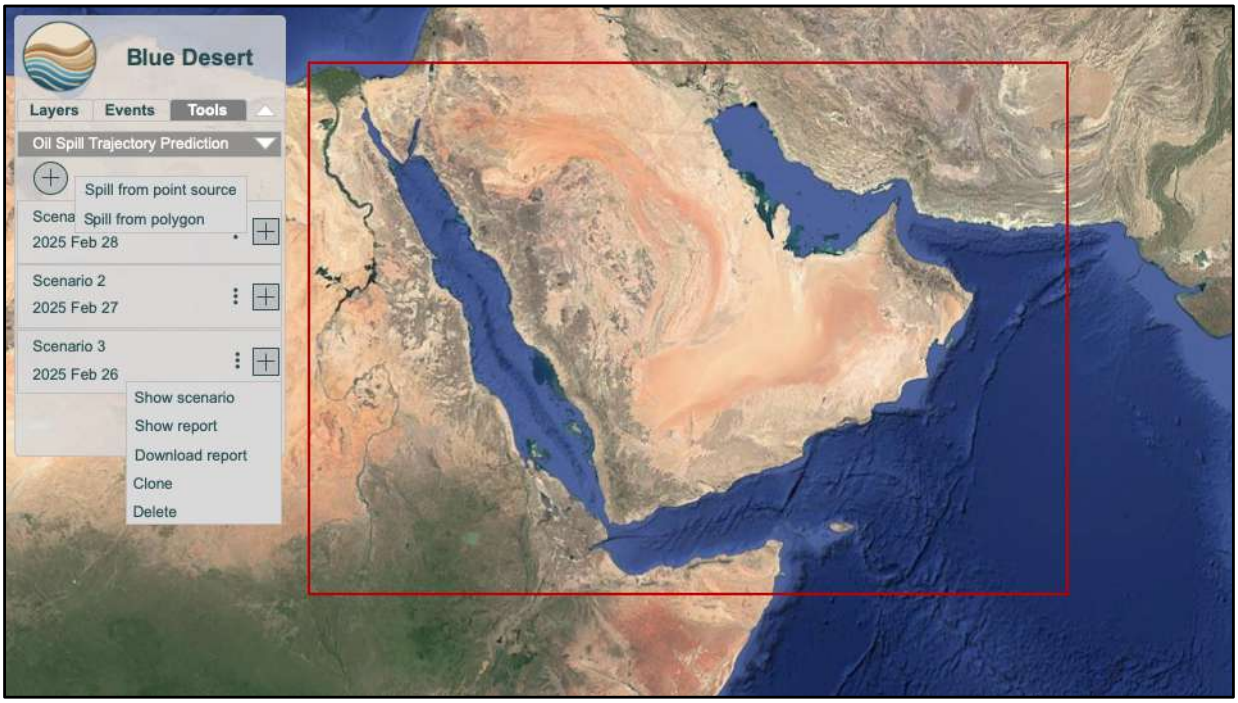
In this example, the ocean current velocity has been added to the Layers Manager tab, in addition to Scenario 1 of an oil spill trajectory prediction (by clicking on the + button next to Scenario 1). Oil spill trajectory predictions are time-series data that are visualized over the future 7 days. Moreover, these predictions consist of 4 layers each according to the state of oil at every time step: oil on the surface, beached oil, dispersed oil (in the water column) and sedimented oil. For every oil spill trajectory prediction, users should be able to show/hide these different layers of oil state. Statistics on the state of oil and its distribution should also be shown at every time step, e.g., percentages of: oil on the surface, beached oil, dispersed oil (in the water column) and sedimented oil, in addition to the oil slick area and volume on the sea surface. The time step (or time increment) for oil spill trajectory predictions is 3 hours.



The Arabic version of the Oil Spill Trajectory Prediction tab.


Blue Desert
Layers
Events
Tools
Oil Spill Trajectory Prediction
Create new oil spill trajectory prediction
Scenario 1
2025 Feb 28
Scenario 2
2025 Feb 27
Scenario 3
2025 Feb 26


Blue Desert
الطبقات
الأحداث
الأدوات
التنبؤ بمسار الانسكابات النفطية
بدء تنبؤ جديد لمسار انسكاب نفطي
سيناريو 1
28 فبراير 2025
سيناريو 2
27 فبراير 2025
سيناريو 3
26 فبراير 2025



Two types of oil spill scenarios can be created and simulated under the Oil Spill Trajectory Prediction tab: a spill from a point source, and a spill from a polygon (or oil contour from a satellite image). For every (simulated) oil spill scenario, 5 options can be selected from a menu (by clicking on the 3 dots next to each scenario):

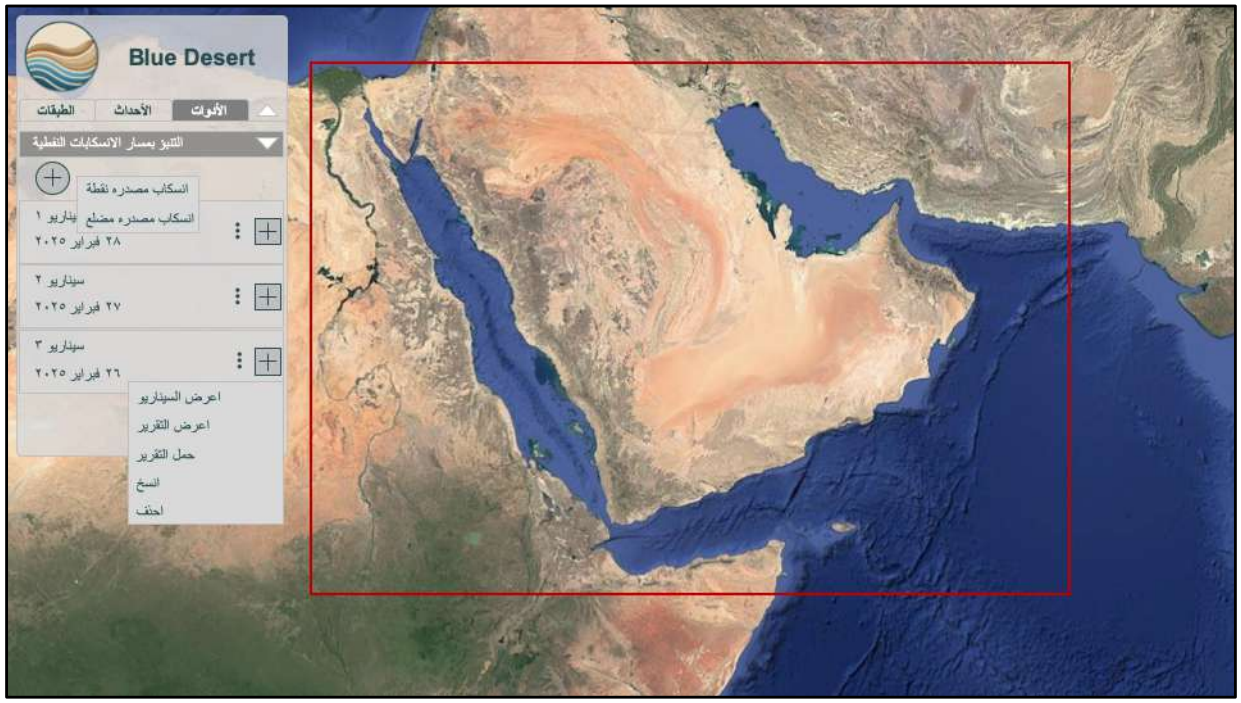
. Show scenario: show oil spill scenario information, such as the source location, spill date and time, etc. This information is the same as the information collected in the form that the user fills out prior to launching an oil spill trajectory prediction simulation.

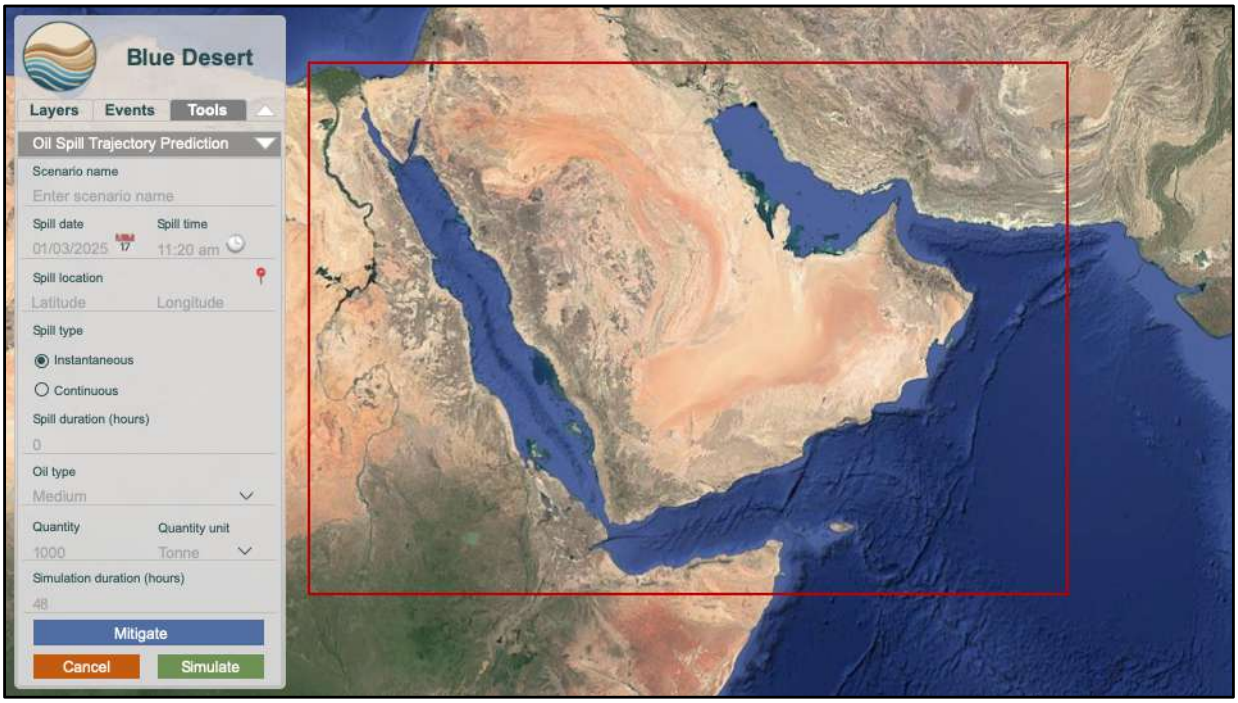
. Show report: show a brief report about the results of the oil spill scenario (over the future 7 days).

. Download report: download the report in PDF format including maps of the oil spill impact.

Clone: clone the scenario by creating a new oil spill trajectory prediction form and filling it out with the same information as in the cloned scenario.

Delete: delete the scenario.

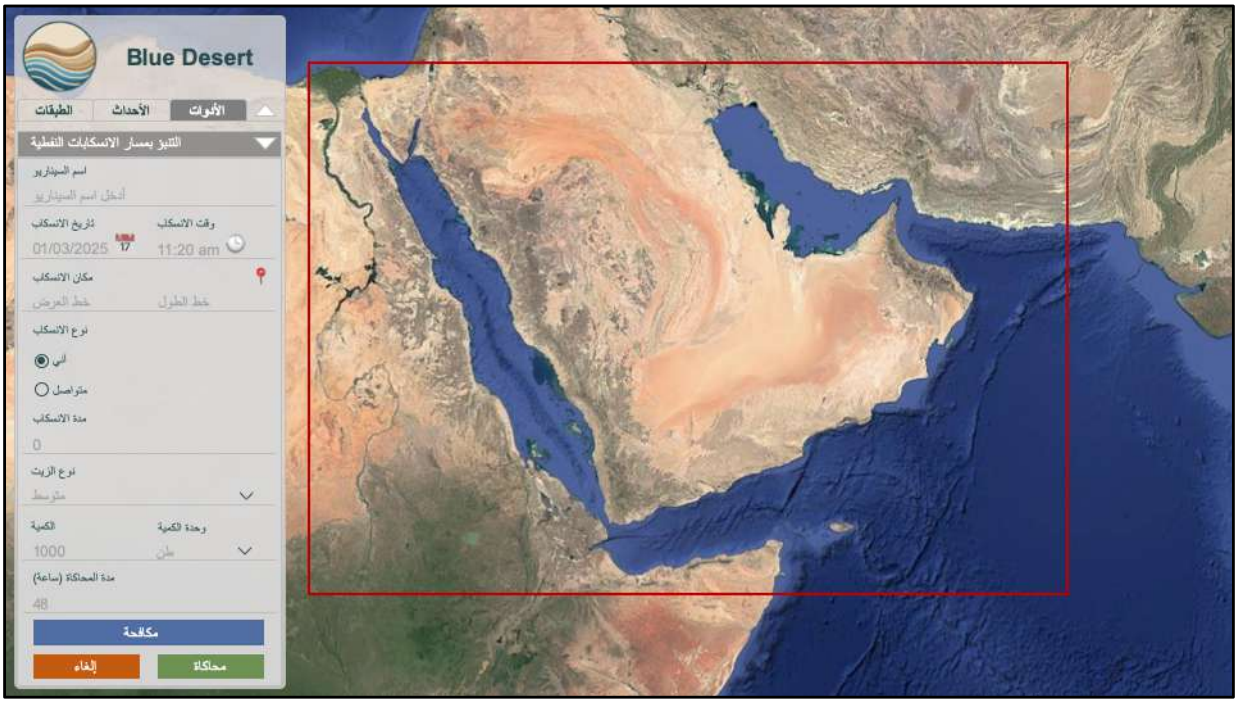

Blue Desert
الأدوات
الأحداث
الطبقات
التنبؤ بمسار الاسكابات النفطية
انسكاب مصدره نقطة
انسكاب مصدره مضلع
سيناريو ١
٢٨ فبراير ٢٠٢٥
سيناريو ٢
٢٧ فبراير ٢٠٢٥
سيناريو ٣
٢٦ فبراير ٢٠٢٥
اعرض السيناريو
اعرض التقرير
حمل التقرير
انسخ
احذف



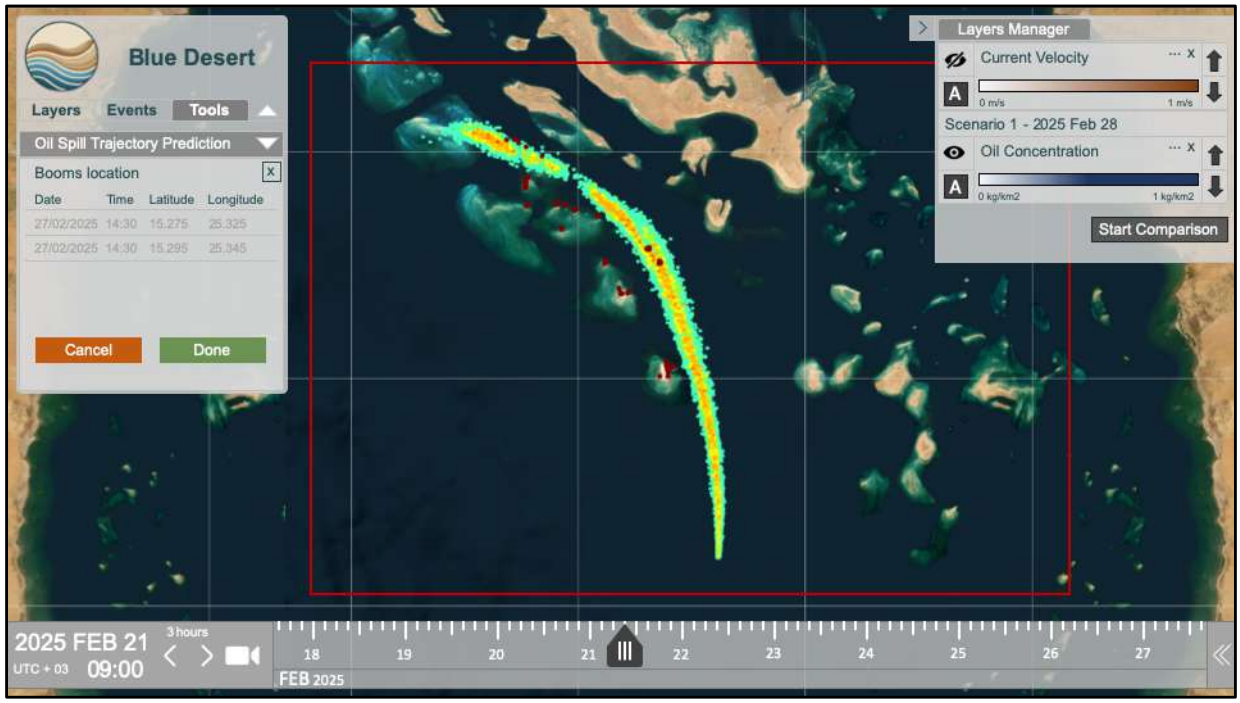
This is the form that appears when creating a new oil spill trajectory prediction from a point source (or when cloning an existing oil spill trajectory prediction from a point source). The user fills out (in case of a new prediction) or modify (in case of a cloned scenario) the form and can either launch a simulation (Simulate) or choose to explore mitigation measures and deploy booms (Mitigate) before launching the simulation.

Note that when the spill type is instantaneous, the spill duration is set to zero and its entry is greyed out (does not accept user input). Oil type can be one of: light, medium or heavy. When a simulation is launched, the form is translated into a text file that the oil spill trajectory forecasting model reads, and the model is run.

Timezone?

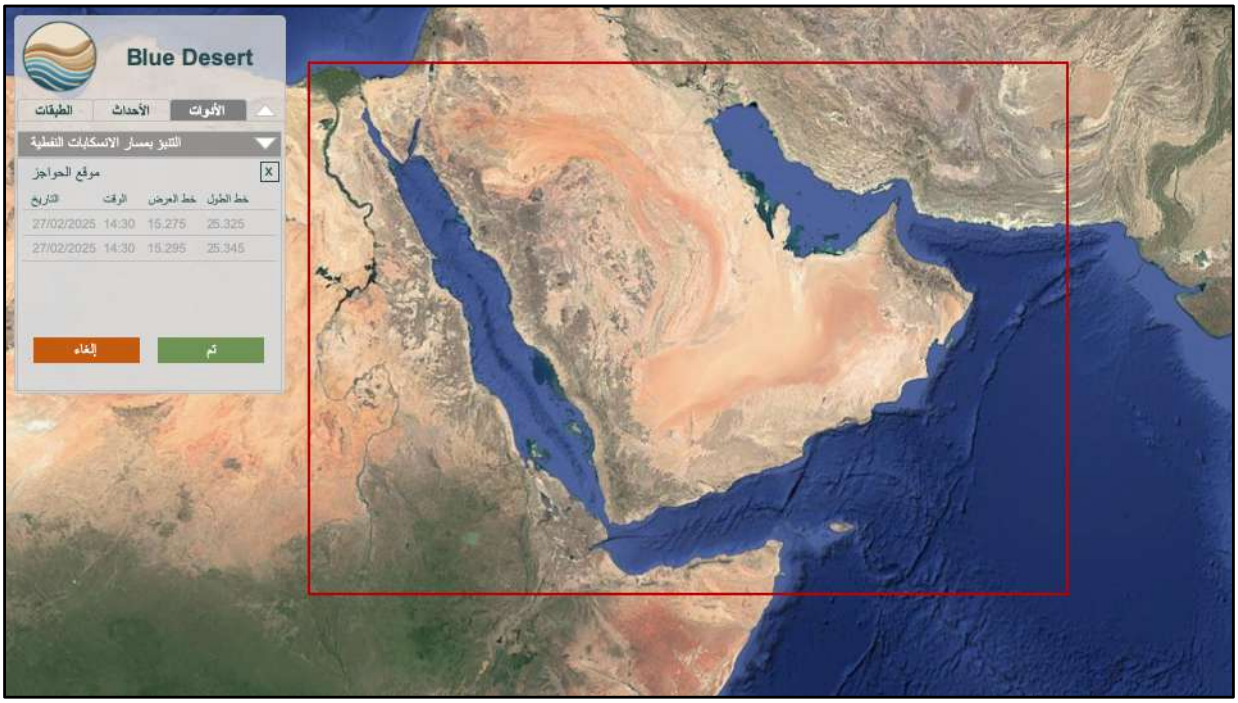


The Arabic version of the (point source) oil spill trajectory prediction form.

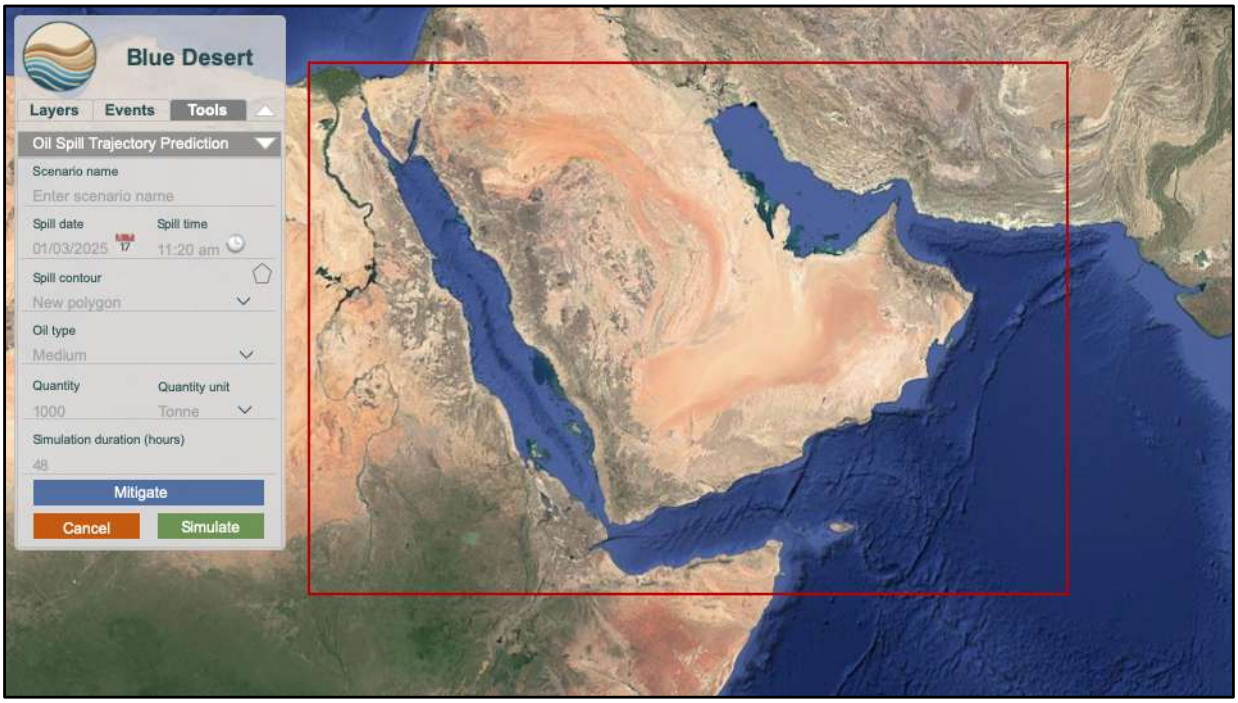


This is the booms deployment form. It opens up when the user clicks on Mitigate in the oil spill trajectory prediction form. The user can visualize a previously simulated scenario, jump to the desired date and time (through the timeline at the bottom of the screen) and draw line segments on the map (with a line drawing tool) representing booms. This information (booms location, date and time) is then reflected in the booms deployment form. The user can change the date and time, and place booms as needed before closing the form (Done).

Timezone?

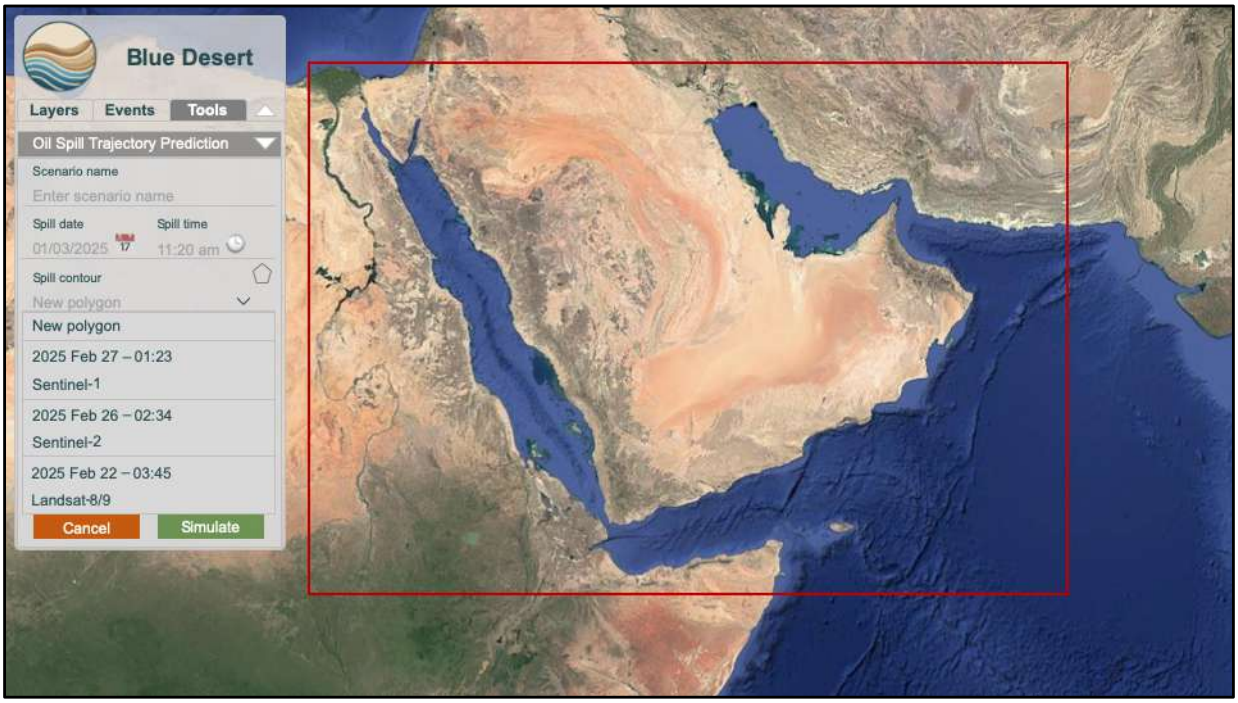


The Arabic version of the booms deployment form.

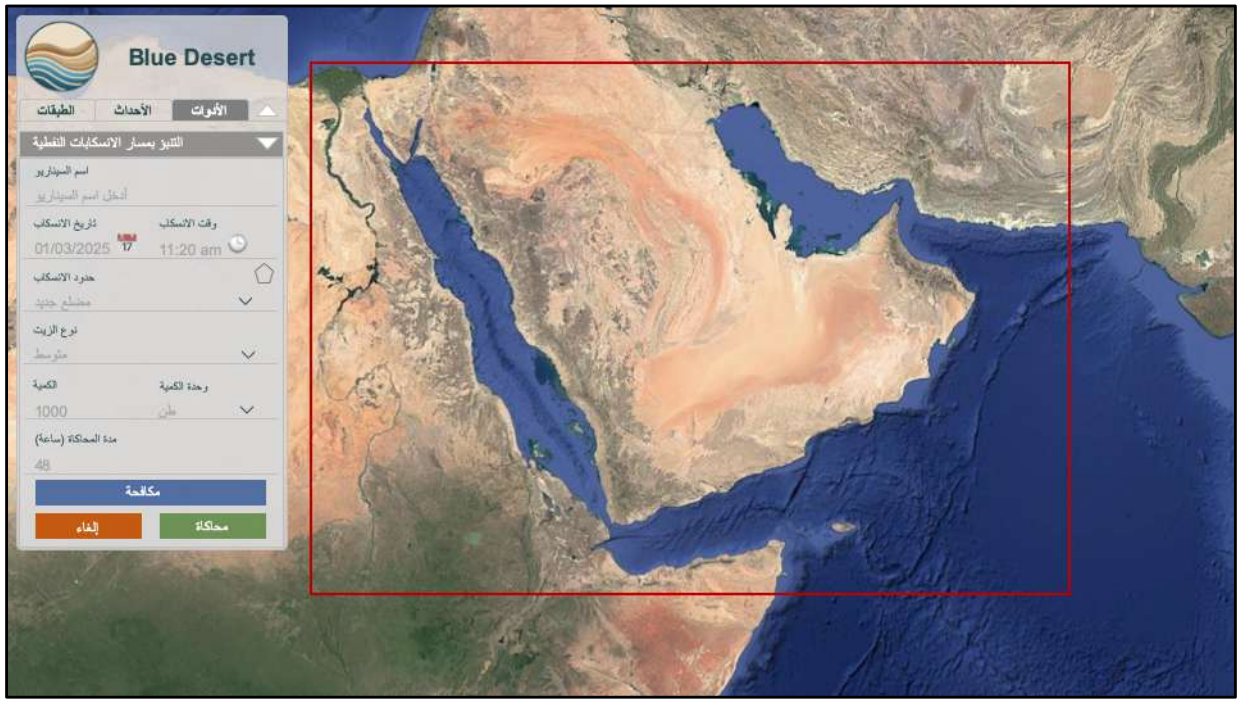


This is the form that appears when creating a new oil spill trajectory prediction from a polygon (or when cloning an existing oil spill trajectory prediction from a polygon). The user fills out (in case of a new prediction) or modify (in case of a cloned scenario) the form and can either launch a simulation (Simulate) or choose to explore mitigation measures and deploy booms (Mitigate) before launching the simulation.

Timezone?



The user can draw a new polygon on the map with a polygon drawing tool, or choose an existing polygon of an oil spill contour from a previously detected oil spill event (i.e., the events listed under the Events/Oil Spills tab).



The Arabic version of the (polygon) oil spill trajectory prediction form.