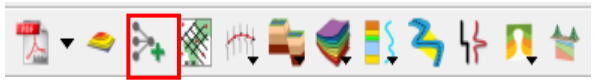
Exercise objective:

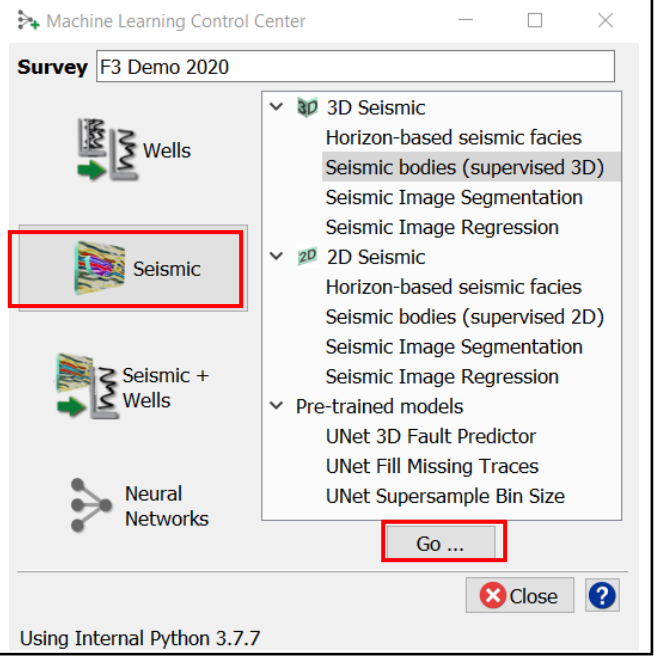
To predict seismic geo-bodies using the "*Seismic bodies (supervised 3D)"* tool which is part of the machine learning plugin. In this exercise, we want to predict Chimney location.

Seismic data Preparation
Seismic need to be available in the survey. If not, **import** seismic, and interpret key seismic bodies locations (e.g. Chimney yes, Chimney no), or use existing trained model.



Workflow:

1. **Open** the Machine Learning Control Center with the  icon.
2. **Click** on Seismic.
3. **Select** Seismic bodies (supervised 3D), and **Hit** Go.



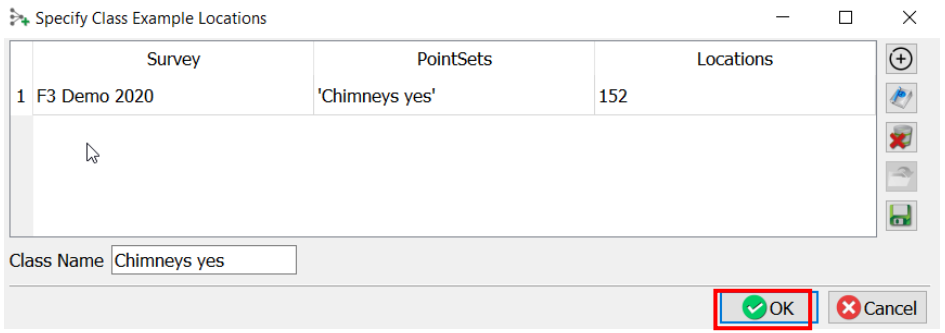
Workflow cont'd:

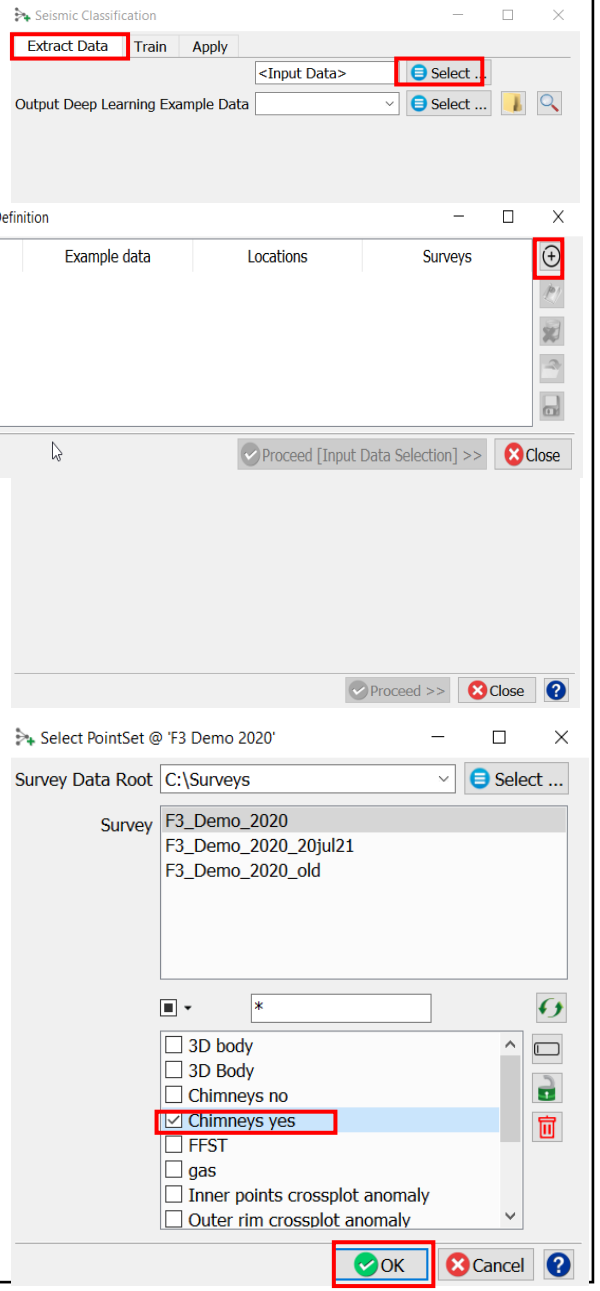
4. *"Seismic Classification"* window pops up. **Select** *Input Data* in the ''*Extract Data" tab.*

5. In the ''Class Definition'' window. **Select**  icon in to ''Add Class Definition''.

6. In the "Select PointSet" *window,* **Select** the *Survey and* the 1st *Class Example Locations (e.g. Chimney yes)*.

7. **Press** OK in the *"Specify Class Example Locations"* window.



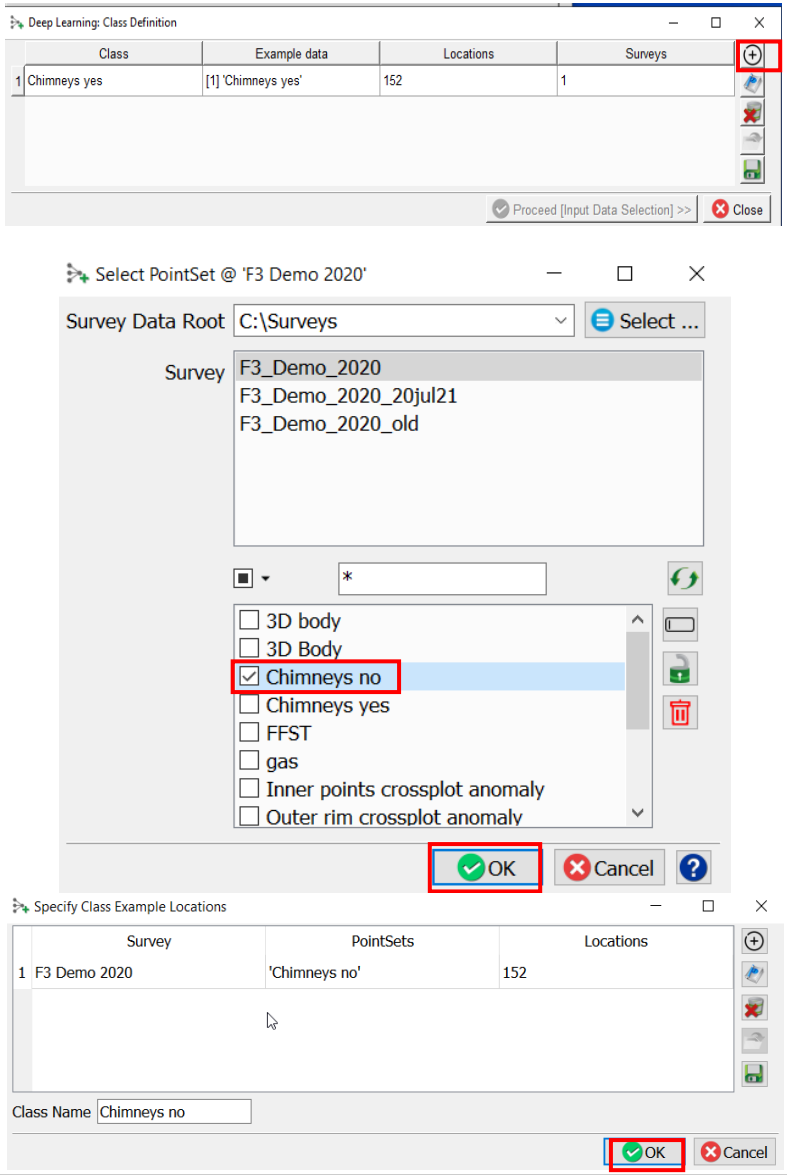


Workflow cont'd:

8. In the "Deep Learning: *Class Definition" Window,* **Hit** icon ⊕ to add more PointSet.

9. In the "Specify PointSet" *window,* **Select** the *Survey and* the 2nd *class example locations (e.g. Chimney no)*.

10. **Press** OK in the *"Specify Class Example Locations"* window.

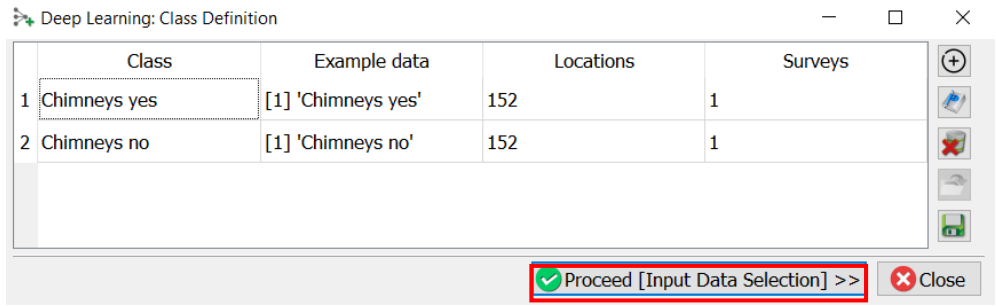


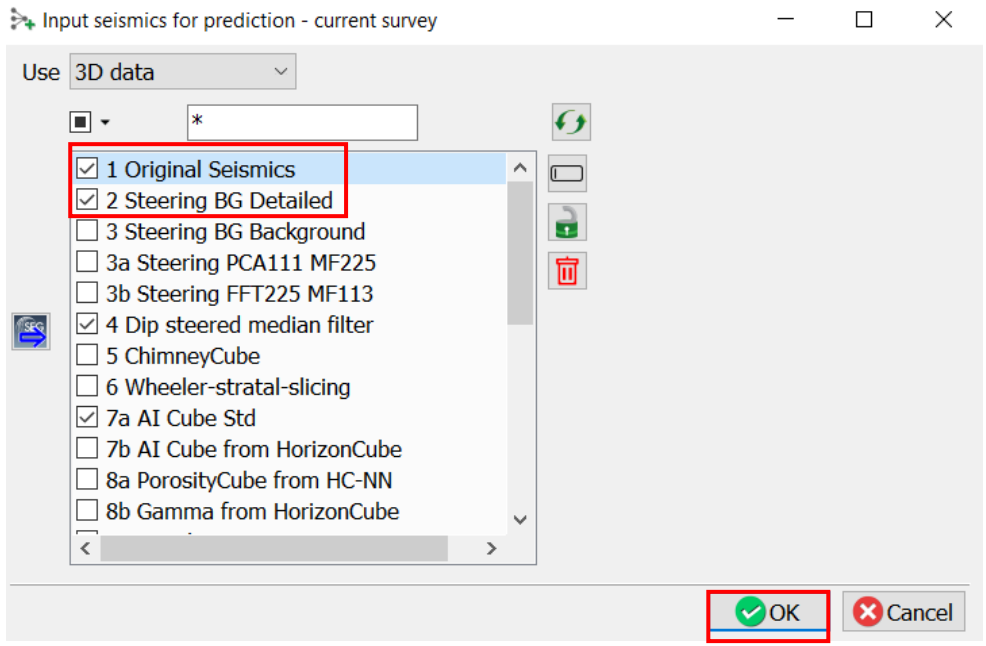
Workflow cont'd:

11. In the *"Deep Learning: Class Definition"* window, **Verify** that the default selected data are correct. **Press** Proceed [Input Data Selection].

12. In the *"Input Seismic for prediction"* window, **Select** the appropriate 3D *seismic cubes, and seismic attributes.*

13. **Press** OK.





Workflow cont'd:

14. *"Input Data"* window pops up.

Input cubes can be modified. Keep the default parameters as indicated in this window.

15. **Specify** a new name for the *Output Deep Learning Example Data (e.g. DL_Example_Chimney_st8x8x16Z4).*

16. **Press** Proceed.

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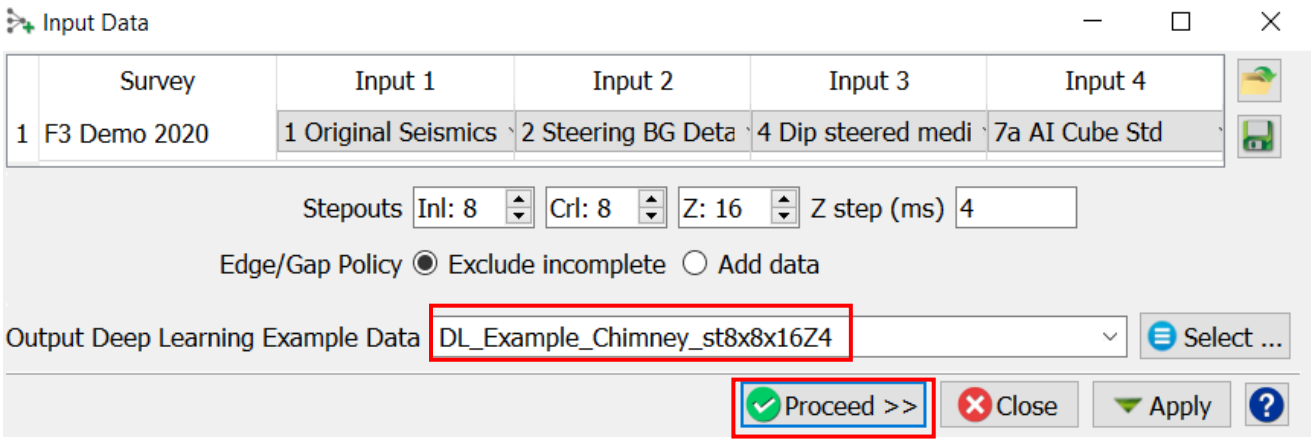


Workflow cont'd:

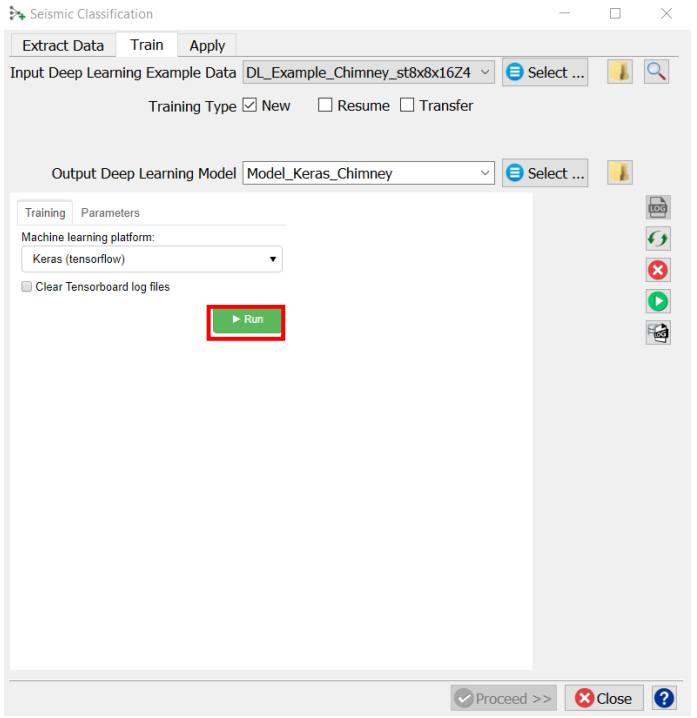
17. *Train* tab opens-up. Select one of the learning algorithm (e.g. Keras-tensorflow) to train the extracted examples data.

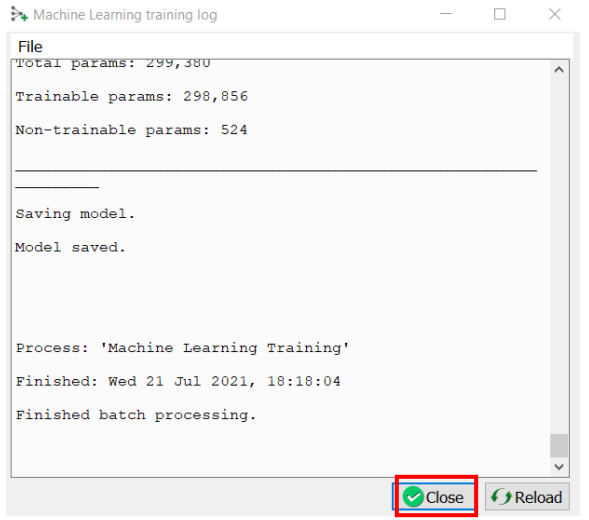
> Different machine learning platforms and parameters can be tested. Keep the defaults parameters.

18. **Specify** a new *Output mode*l name (e.g Model_Keras_Chimney).

19. **Press** Run.

20. Once the computation is done, **Close** the ML log window.



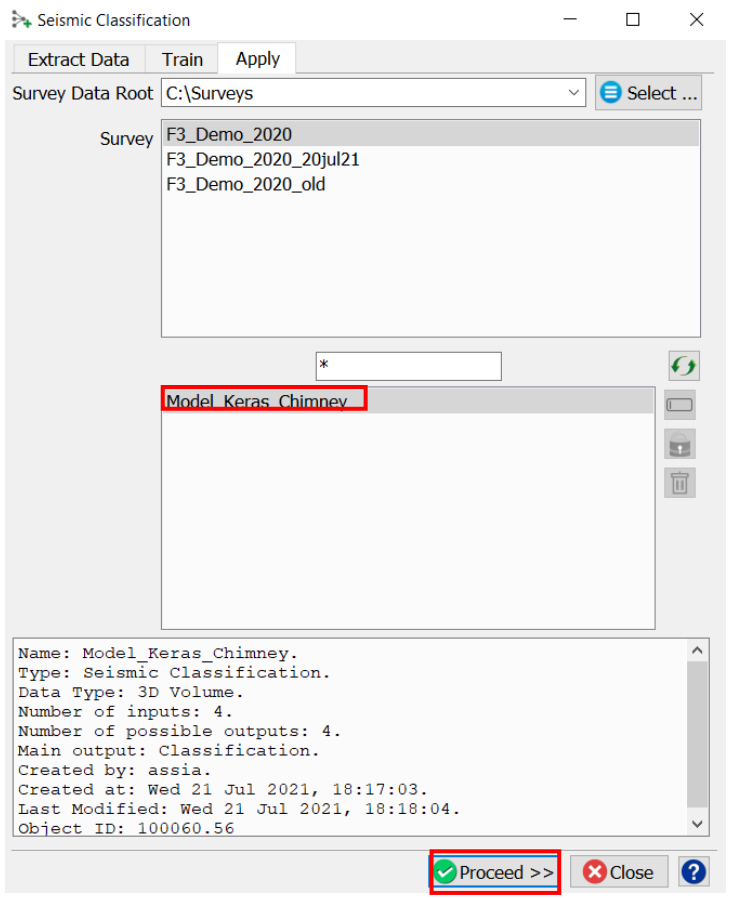


Workflow cont'd:

21. **Select** the ''Apply'' tab. Check all selected data Ok.

*The Survey, Training model can be modified here if necessary.

22. **Press** Proceed.



* The option to select data from other surveys is available only in commercial projects

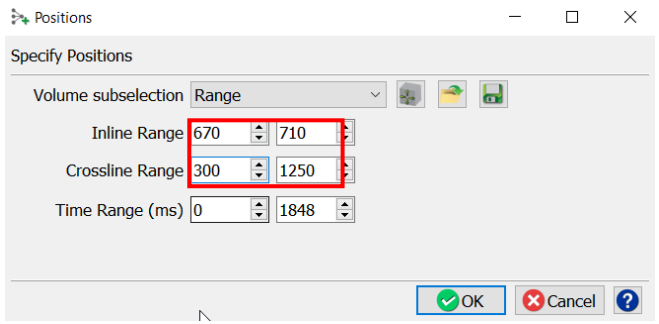
Workflow cont'd:

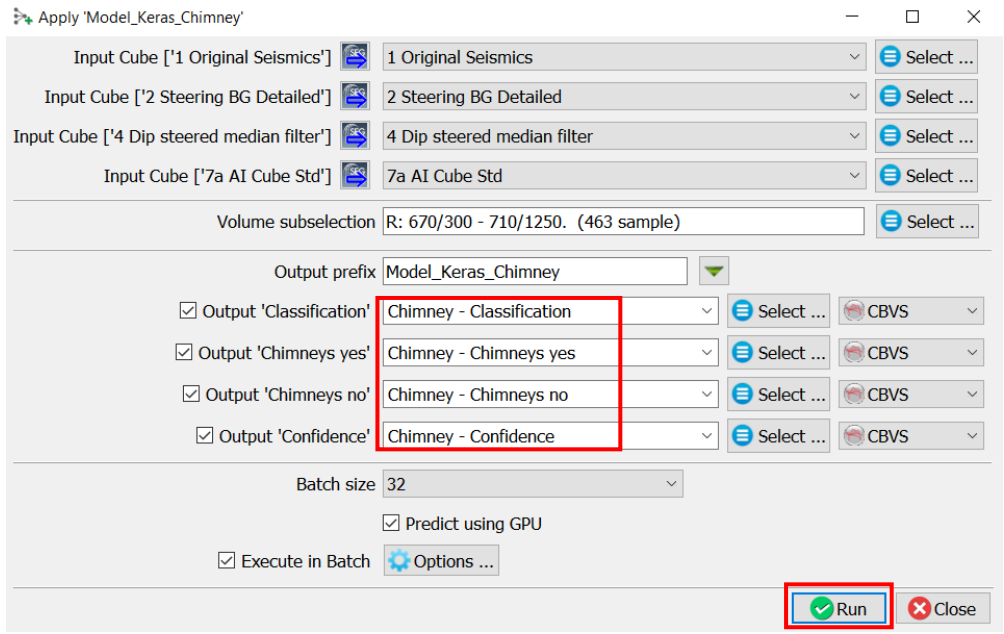
23. In the *"Apply created training model"* window, **Verify,** all the default selected input 3D cubes are correct.

    a. To optimize computation time, **Modify** ''Volume sub-selection'' and set it to an area of interest, where Chimneys have been interpreted (e.g. Inline range: 670-710, Crossline range: 300-1250).

    b. Specify a new name for the 3D output cubes: Classification, Chimney yes, Chimney no, and Confidence.

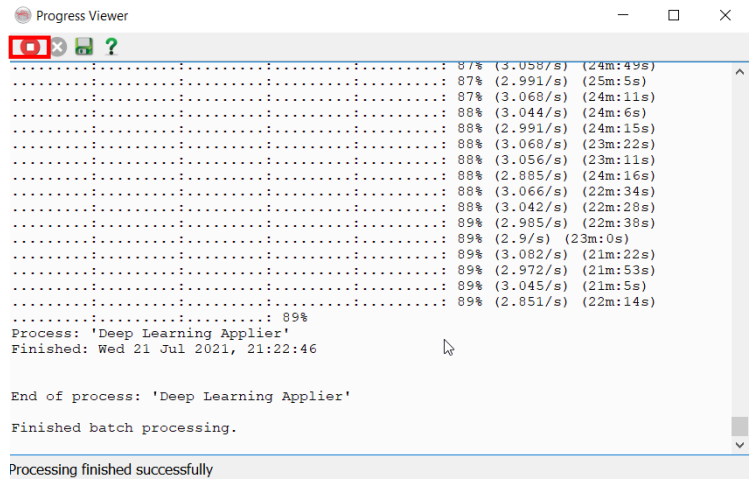
24. Press Run to continue.

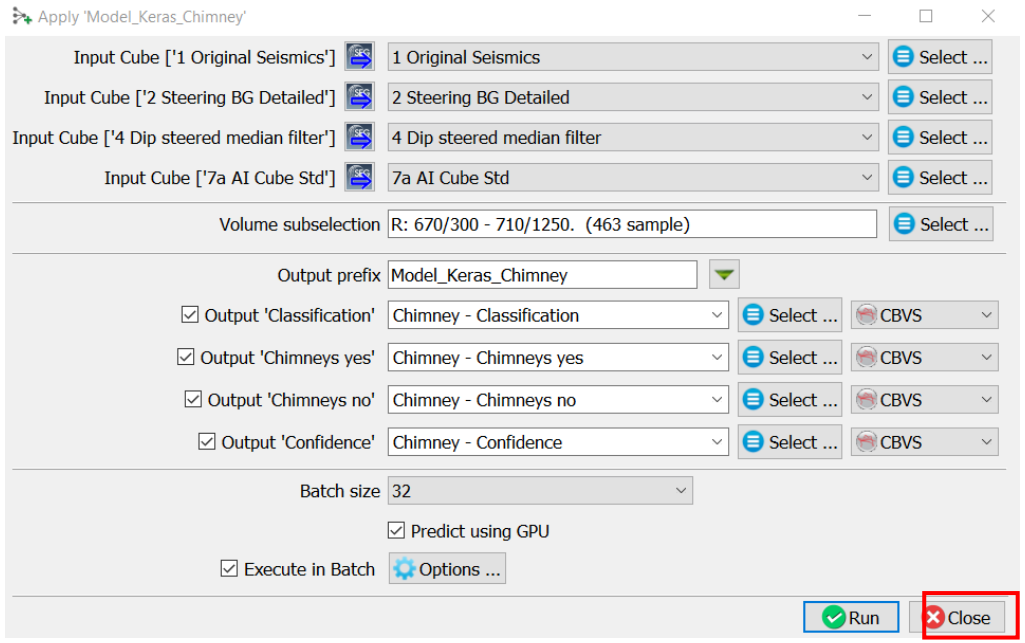




Workflow cont'd:

25. When the processing is done, **Close** the "*Progress Viewer*" and the ''*Apply Model*" windows.





Workflow cont'd:

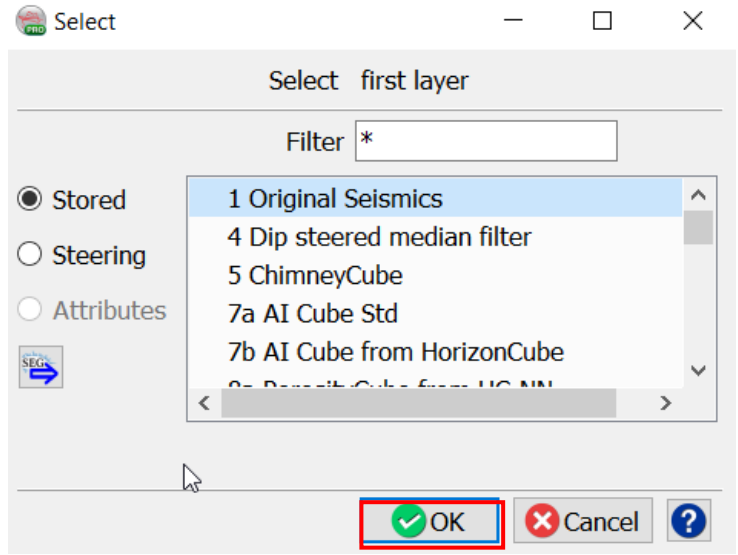
QC results: display the predicted Chimney Yes probability 3D cube

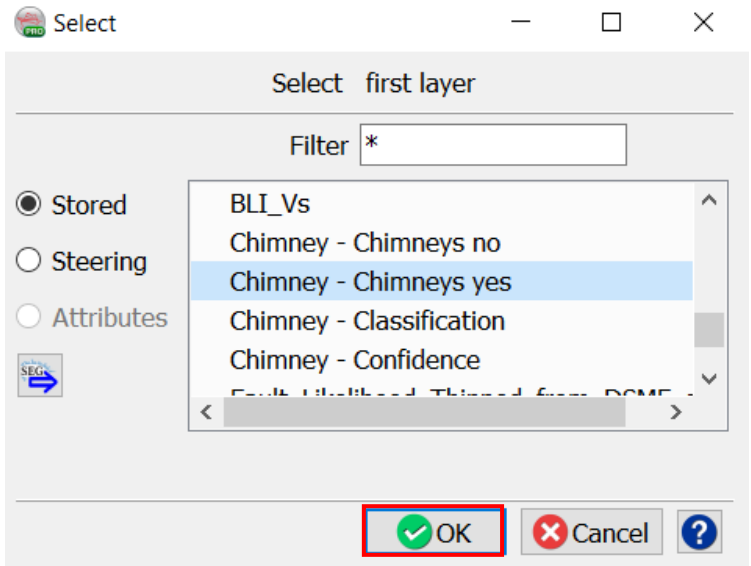
26. **Right Click** on the: Scene > Inline > Add and select Data.

27. **Select** the predicted 3D Chimney location probability (e.g. Chimney_yes), and overlay the seismic (e.g. 1 Original Seismic).

    Modify the Inline number to be within the input range.

28. **Right-click** on the Inline number, and **Type** in the Inline field: In-line 690 .





Workflow cont'd:

QC results: display the predicted Chimney and overlay the original seismic on in-line 690.