

# Kansas Earthquake 3D & 2D Plot Animation Java Applet

by John R. Victorine

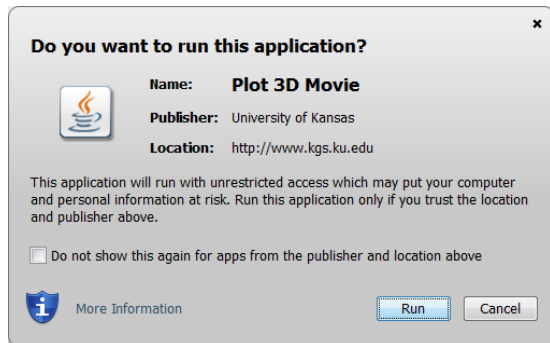
## Introduction

This applet produces Two Animation plots, 2D (latitude vs. longitude) and 3D (latitude, longitude and depth) for earthquakes in Harper & Sumner Counties in Kansas. SWD (Salt Water Disposal) Wells that fall within the Harper & Sumner Counties that are drilled into the Arbuckle or have depths greater than 5500 feet were also included in the 2D & 3D plots. The Earthquake data is stored in the "gis\_webinfo earthquakes" ORACLE Database Table on the Kansas Geological Server.

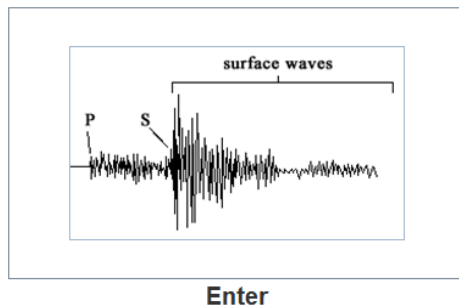
The plots displays the data collected from 17 July 2014 to present. The Applet accesses the earthquake data using an ORACLE PL/SQL Stored Procedure that will generate an Extensible Markup Language (XML) data stream, the applet will then parse the XML Stream for the earthquake data and plot automatically, the ORALCE PL/SQL Stored Procedure URL is, [http://chasm.kgs.ku.edu/ords/iqstrat.ks\\_earthquakes\\_pkg.getXML](http://chasm.kgs.ku.edu/ords/iqstrat.ks_earthquakes_pkg.getXML).

To access the Kansas Earthquakes 3D Plot Animation web site, go to the web address, [http://www.kgs.ku.edu/PRS/Ozark/Software/KS\\_Earthquake\\_3DMovie/index.html](http://www.kgs.ku.edu/PRS/Ozark/Software/KS_Earthquake_3DMovie/index.html). At the top of the web page there is a menu "Main Page|Description|Applet|Help|Copyright &

Disclaimer|". Select the "Applet" menu option a "Warning - Security" Dialog will appear (*"Do you want to run this application?"*). The program has to be able to read and write to the user's PC and access the Kansas Geological Survey (KGS) Database and File Server, ORACLE requires this dialog. The program does not save your files to KGS, but allows you to access the KGS for well information. The program does not use Cookies or any hidden software. The blue shield on the warning dialog is a symbol that the Java web app is created by a trusted

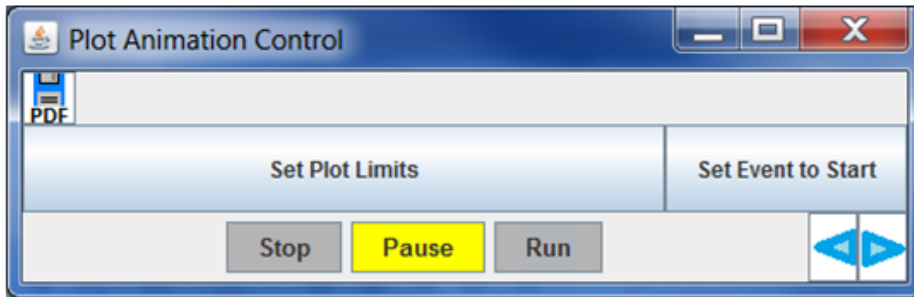


source, which is the University of Kansas. Select the "Run" Button, which will display the Seismic Image Icon Button in the "Enter" Panel illustrated below,



This program will automatically read the earthquake data & SWD (Salt Water Disposal) Wells from the Kansas Geological Survey (KGS) ORACLE Database and plot the data with a plot control dialog appearing at the top center of the computer screen and the Animation Plots in the center, 2D Animation Plot appearing to the left and the 3D Animation Plot appearing to the right. The data is presented simultaneously as it marches through each event. Click on the Seismic Icon button to run the program.

To start the animation select the “Run” Button, which will turn yellow and the each earthquake will appear on both plots simultaneously with the date & time appearing in the 3<sup>rd</sup> title on each plot. Select the “Pause” Button, which will turn yellow and pause the animation at the event. Select the “Run” Button to resume the animation. Select the “Stop” Button, which will turn yellow and reset to the first earthquake.



**PDF** – capture a specific time event and make PNG images with the capability of converting each image into a PDF document.

Stop

**Stop animation** – stop animation and reset to beginning event.

Pause

**Pause animation** – stop animation at event.

Run

**Run animation** – steps through each event at ½ second intervals.



**Previous** – steps back one event.



**Next** – steps forward one event.

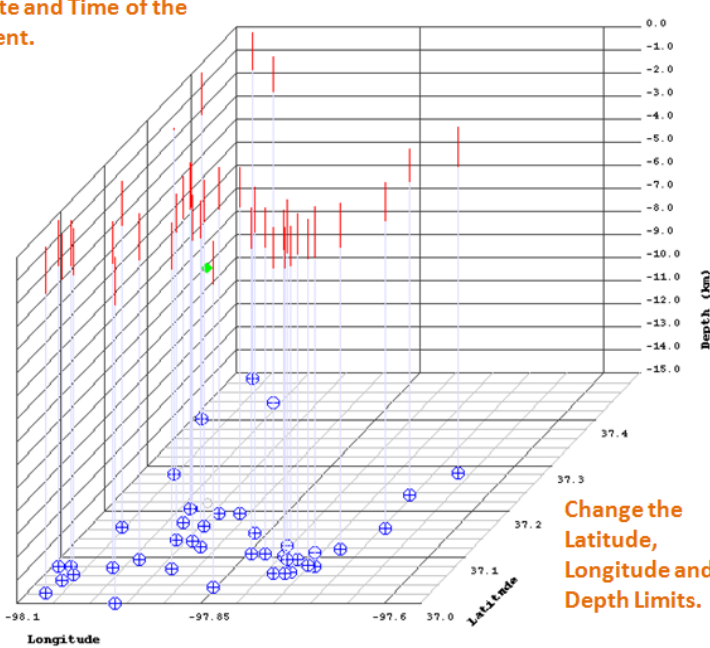
**Set Plot Limits** – Allows the user to change the plot limits as well as turning well symbols on or off.

**Set Event to Start** – Allows the user to select a specific event and display to 2D & 3D Plot.

This control panel allows the user to step to previous or next events as well as capturing the images as Portable Network Graphics (PNG) images.

Change the 1<sup>st</sup> and 2<sup>nd</sup> titles, 3<sup>rd</sup> title is for the Date and Time of the Event.

Kansas Geological Survey  
 Kansas Earthquakes - Animation  
 2014-10-02 12:35:43.0






Magnitude:  
 > 4.5  
 4.0 - 4.5  
 3.5 - 4.0  
 3.0 - 3.5  
 2.5 - 3.0  
 2.0 - 2.5  
 1.0 - 2.0

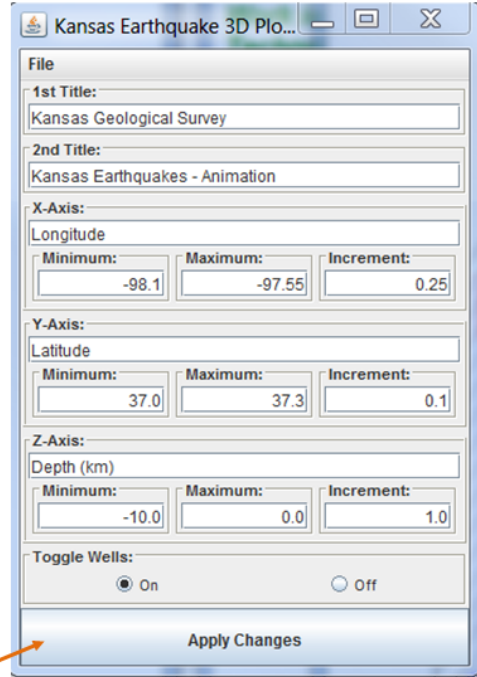
Each earthquake is colored by its magnitude.

Well Symbols can be toggled on or off.

**Symbol Description**

-  SWD – Salt Water Disposal Well
-  SWD Well Surface to TD
-  Earthquake Data

Change the Latitude, Longitude and Depth Limits.



**Apply Changes** – Retrieves the users changes from the Limits Dialog and transfers the data to the 2D & 3D Plots.

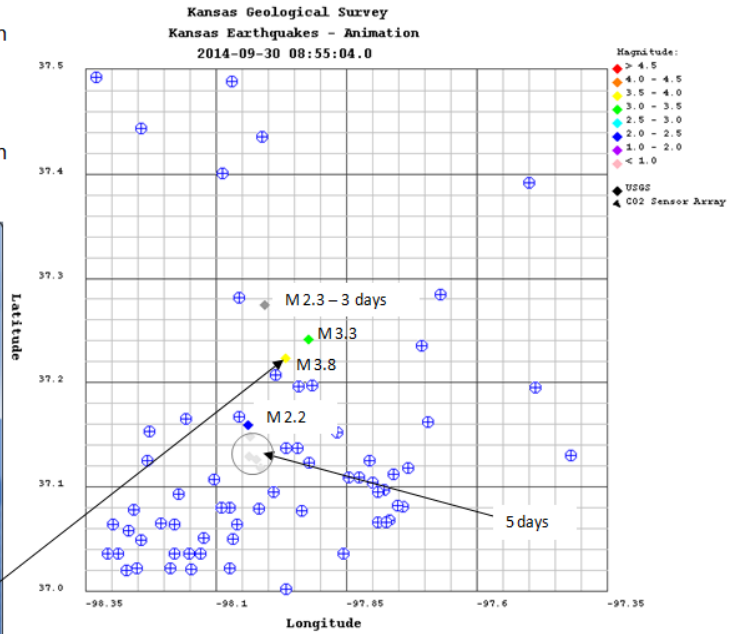
To change the limits of the plot area or turn the well symbols on or off, select the “Set Plot Limits” Button, which will display the Change Plot Limits Dialog. The user changes the scales, sets the well symbols radio buttons on or off and clicks on the “Apply Changes” to send the information back to the Animation Control Dialog, which will apply the user’s limits to the animation.

NOTE: When the Change Plot Limits Dialog is displayed the Animation Control Buttons are disabled and when finished the Change Plot Limits Dialog disappears then the Animation Control Buttons are then enabled. If the animation is running when the “Set Plot Limits” button is selected, the Animation Control will automatically Stop the animation and disable the buttons and display the Change Plot Limits Dialog.

Highlight the event you wish to display and click on the “Select” button to display it in the 2D & 3D Plots.

The Event and the previous 5 days are displayed on the plot. 1 to 5 days are plotted as shades of gray.

Date	Magnit.	Latitude	Longitude	Depth	Source
2014-07-17 04:40:43.0	3.6	37.1018	-97.8075	-5.0	USGS
2014-07-19 18:24:58.0	3.0	37.224	-97.9469	-5.53	USGS
2014-07-20 06:24:58.0	3.3	37.3406	-98.1023	-4.59	USGS
2014-07-25 01:17:24.0	2.4	37.0291	-97.818	-5.0	USGS
2014-07-26 04:57:10.0	3.4	37.1165	-97.8044	-2.77	USGS
2014-07-27 19:14:48.0	2.1	37.0309	-97.9081	-4.5	USGS
2014-08-04 06:50:27.0	2.5	37.2309	-97.9854	-4.85	USGS
2014-08-10 15:23:12.0	2.2	37.1893	-97.9751	-5.0	USGS
2014-08-20 10:33:58.0	3.1	37.2481	-97.9628	-6.76	USGS
2014-08-24 18:10:05.0	3.0	37.3735	-98.1086	-8.67	USGS
2014-08-27 09:11:25.0	2.8	37.0455	-97.8518	-5.0	USGS
2014-09-08 06:56:52.0	3.4	37.262	-97.8345	-4.92	USGS
2014-09-08 09:23:30.0	3.1	37.2714	-97.6235	-6.55	USGS
2014-09-17 08:42:32.0	2.2	37.1133	-97.9936	-5.0	USGS
2014-09-17 09:11:19.0	2.2	37.1305	-98.0142	-5.0	USGS
2014-09-25 00:46:24.0	2.8	37.1177	-98.0197	-5.0	USGS
2014-09-25 09:43:23.0	2.5	37.118	-98.0134	-5.0	USGS
2014-09-25 15:04:55.0	2.5	37.1482	-98.0323	-5.0	USGS
2014-09-25 19:34:41.0	2.4	37.1269	-98.0202	-5.0	USGS
2014-09-25 20:14:24.0	2.0	37.1296	-98.0357	-5.0	USGS
2014-09-27 14:46:45.0	2.3	37.2747	-98.0049	-5.0	USGS
2014-09-30 05:18:35.0	2.2	37.1595	-98.0366	-5.0	USGS
2014-09-30 06:30:26.0	3.3	37.2415	-97.9207	-7.73	USGS
2014-09-30 08:55:04.0	3.8	37.2235	-97.964	-3.61	USGS
2014-09-30 09:24:31.0	3.1	37.2474	-97.9414	-4.18	USGS
2014-09-30 10:47:58.0	3.2	37.2359	-97.9677	-5.0	USGS
2014-09-30 11:47:22.0	2.6	37.2611	-97.9552	-5.0	USGS
2014-09-30 12:49:52.0	2.9	37.2453	-97.9565	-8.03	USGS
2014-09-30 18:33:28.0	3.0	37.3854	-95.3831	-5.0	USGS
2014-10-01 00:11:06.0	3.3	37.2243	-97.8898	-5.0	USGS
2014-10-02 12:01:24.0	4.3	37.2382	-97.9536	-5.0	USGS
2014-10-02 12:02:55.0	3.5	37.2332	-97.9668	-5.0	USGS
2014-10-02 12:03:09.0	2.9	37.227	-97.9502	-5.0	USGS
2014-10-02 12:03:43.0	3.1	37.2329	-97.9747	-5.0	USGS
2014-10-02 12:35:43.0	3.4	37.228	-97.9753	-5.0	USGS
2014-10-02 16:50:49.0	3.1	37.2357	-97.9608	-5.0	USGS
2014-10-03 04:23:18.0	2.7	37.2406	-97.9751	-3.39	USGS
2014-10-06 06:30:52.0	2.7	37.2411	-97.9743	-5.0	USGS
2014-10-09 09:41:41.0	2.7	37.2423	-97.9746	-7.85	USGS
2014-10-09 22:58:51.0	3.3	37.006	-97.9635	-5.0	USGS



In this example the event of interest is at 9/30/2014 8:55 M 3.8

All previous events that occur on 9/30/2014 will retain their color, e.g. 9/30/2014 6:30 M 3.3 and 9/30/2014 5:18 M 2.2

All other previous events that occur before 9/30/2014 are shades of gray, e.g.  
 9/27/2014 14:46 M 2.3 dark gray  
 9/25/2014 20:14 M 2.0 very light gray

The “Set Event to Start” button allows the user to go to a specific event of interest and display it on the 2D & 3D plots. The user can only select this dialog when the Plot Control Pause button is selected. If the Change Plot Limits Dialog is selected and the limits are changed or the SWD Well symbols are disabled then the Set Event Table Frame will be closed automatically.