

## Combining SQL Server Management Studio And ArcMap to Recur Hermine Flood Using ODM Database

Fengyan Yang

### Introduction

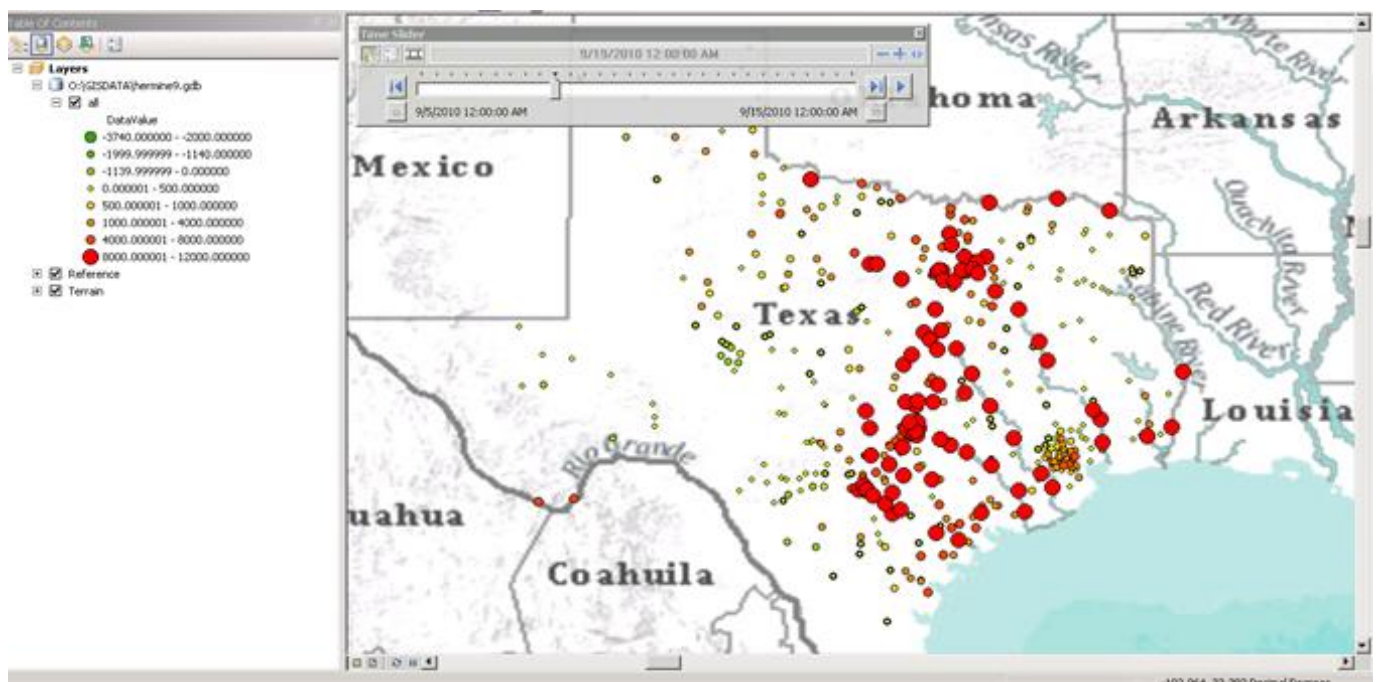


On September 7, 2010, the flood caused by Tropical Storm Hermine swept northward through Texas and into Oklahoma, forcing more than 100 high-water rescues, swamping city neighborhoods, spawning tornadoes and killing at least two people. The storm didn't go away until about September 12 depending on the flood records we have. In addition, the storm caused damage to infrastructure and left many motorists stranded and even fatalities reported. The flood was monitored and recorded every half hour and stored on the USGS web, but they only have one year limit afterwards they got deleted from the web. Fortunately a former student of Dr. Maidment Harish downloaded the data and organized them in the ODM model. The Observations Data Model (ODM) is designed to store hydrologic observations and sufficient ancillary information (metadata) about the data values to provide traceable heritage from raw measurements to usable information allowing them to be unambiguously interpreted and used.

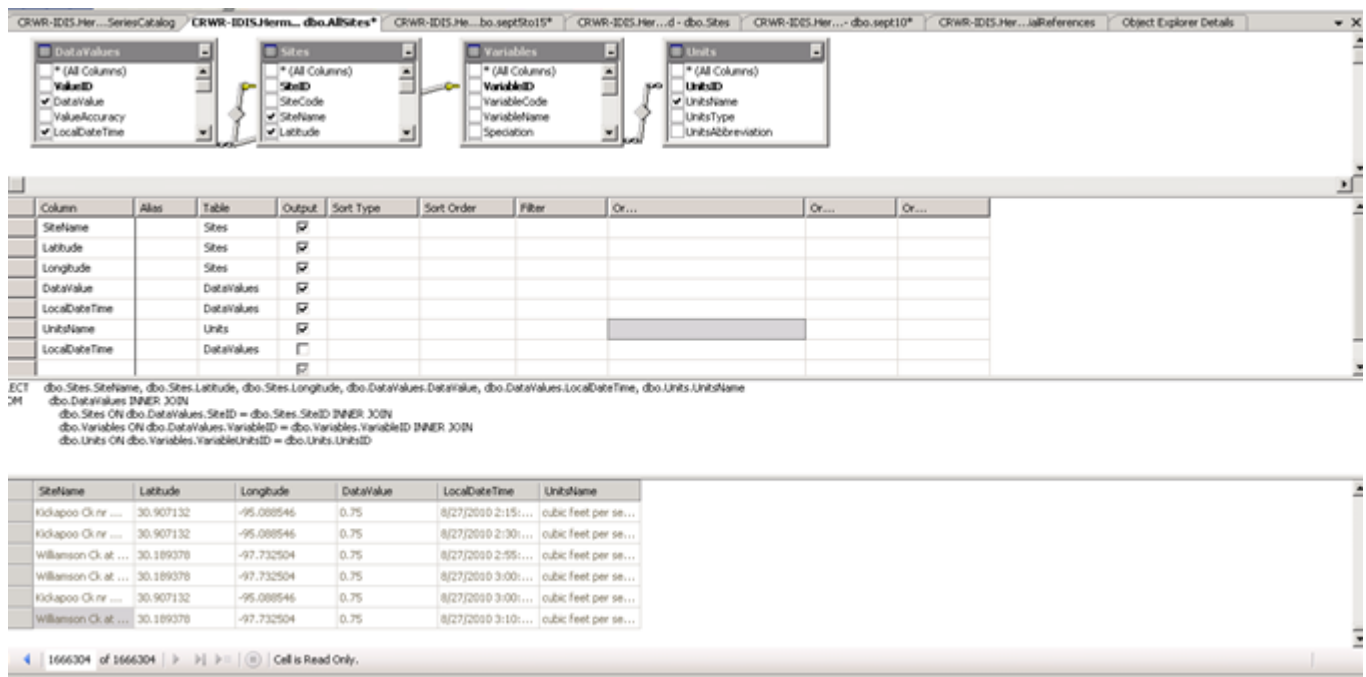
**The goal** of this project is to specify a period of time then create Time-Enabled Feature Layers in ArcMap with ODM flood data for State of Texas which will be executed from the view of SQL Server Management Studio. Then we can recur flood happened in different places in Time-Enabled Feature Layers.

### Progress so far

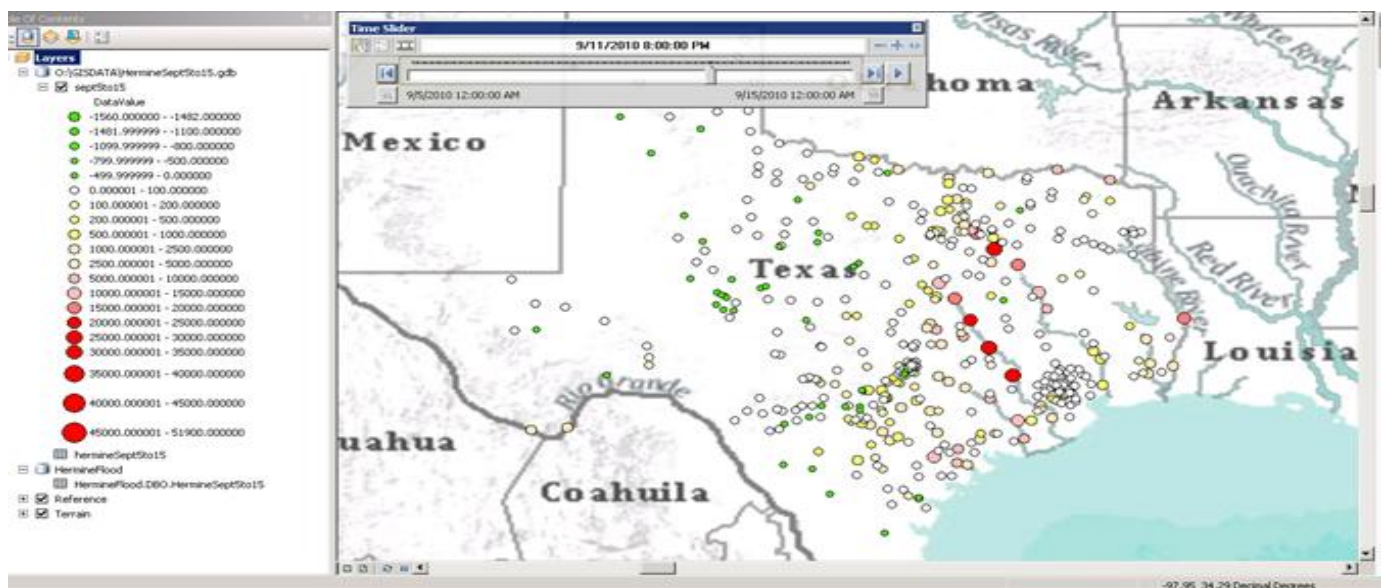
There are about 448 cities or sites in Texas State were influenced by the Hermine flood which was recorded every thirty minutes. Around 300 million of records are available from the Observations Data Model. First, I got a 2-day time step Time Enable Layer for the ODM data from 7/1/2010 12:00:00 AM to 10/27/2010 3:15:00 PM for the 448 sites. Showing below:



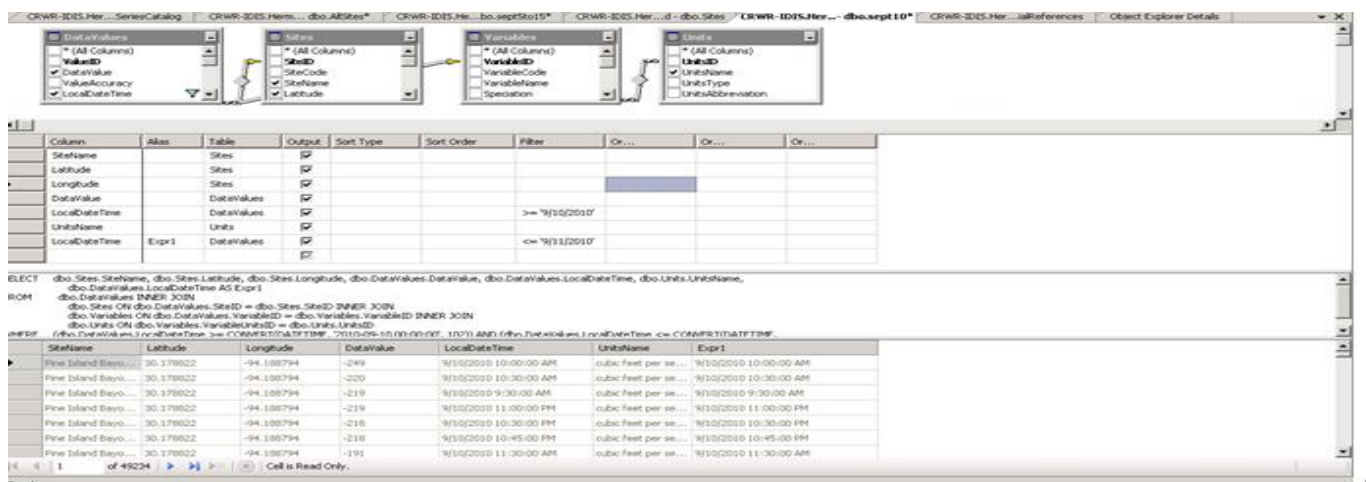
View inSQL:



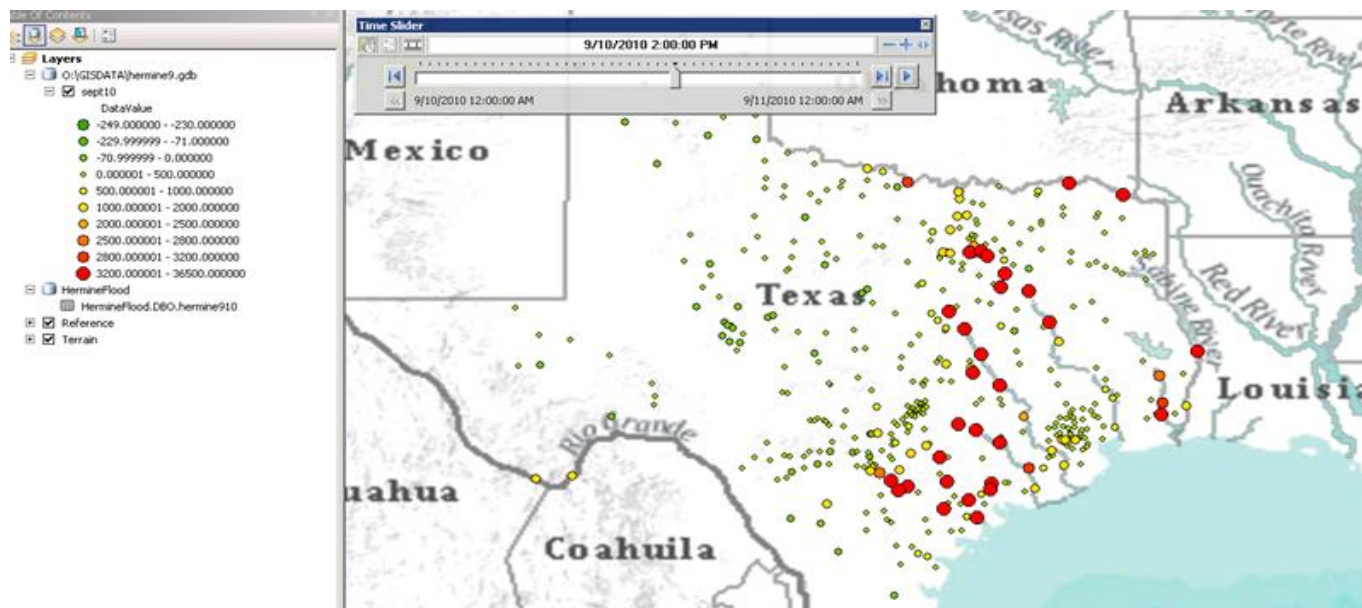
Second, since the data amount is very large and the time period I chose was really long, so it cause the Time Enable Layer loading slowly and animation took a long time before there is a change in ArcMap. Then, I chose the ODM data from 9/1/2010 12:00:00 AM to 9/15/2010 12:00:00 AM for 448 sites. The 1-day time step Time Enable Layer is showed below:



View in SQL:



Third, 24 hour-period of time from 9/10/2010 12:00:00 AM to 9/11/2010 12:00:00 AM for 448 sites, time step 0.5 hour Time Enable Layer was showed in the picture below:



View in SQL:

CRWR-IDIS.Her...SeriesCatalog CRWR-IDIS.Herm... dbo.AllSites\* CRWR-IDIS.He...bo.sept5to15\* CRWR-IDIS.Her...d - dbo.Sites CRWR-IDIS.Her...- dbo.sept10\*

DataValues Sites Variables Units

\* (All Columns) ValueID DataValue ValueAccuracy LocalDateTime \* (All Columns) SiteID SiteCode SiteName Latitude \* (All Columns) VariableID VariableCode VariableName Speciation \* (All Columns) UnitsID UnitsName UnitsType UnitsAbbreviation

	Column	Alias	Table	Output	Sort Type	Sort Order	Filter	Or...	Or...	Or...
	SiteName		Sites	<input checked="" type="checkbox"/>						
	Latitude		Sites	<input checked="" type="checkbox"/>						
	Longitude		Sites	<input checked="" type="checkbox"/>						
	DataValue		DataValues	<input checked="" type="checkbox"/>						
	LocalDateTime		DataValues	<input checked="" type="checkbox"/>			>= '9/10/2010'			
	UnitsName		Units	<input checked="" type="checkbox"/>						
	LocalDateTime	Expr1	DataValues	<input checked="" type="checkbox"/>			<= '9/11/2010'			
				<input checked="" type="checkbox"/>						

```

SELECT  dbo.Sites.SiteName, dbo.Sites.Latitude, dbo.Sites.Longitude, dbo.DataValues.DataValue, dbo.DataValues.LocalDateTime, dbo.Units.UnitsName,
        dbo.DataValues.LocalDateTime AS Expr1
FROM      dbo.DataValues INNER JOIN
        dbo.Sites ON dbo.DataValues.SiteID = dbo.Sites.SiteID INNER JOIN
        dbo.Variables ON dbo.DataValues.VariableID = dbo.Variables.VariableID INNER JOIN
        dbo.Units ON dbo.Variables.VariableUnitsID = dbo.Units.UnitsID
WHERE     (dbo.DataValues.LocalDateTime >= CONVERT(DATETIME, '2010-09-10 00:00:00', 102)) AND (dbo.DataValues.LocalDateTime <= CONVERT(DATETIME, '2010-09-11 00:00:00', 102))

```

	SiteName	Latitude	Longitude	DataValue	LocalDateTime	UnitsName	Expr1
	Pine Island Bayo...	30.178822	-94.188794	-249	9/10/2010 10:00:00 AM	cubic feet per se...	9/10/2010 10:00:00 AM
	Pine Island Bayo...	30.178822	-94.188794	-220	9/10/2010 10:30:00 AM	cubic feet per se...	9/10/2010 10:30:00 AM
	Pine Island Bayo...	30.178822	-94.188794	-219	9/10/2010 9:30:00 AM	cubic feet per se...	9/10/2010 9:30:00 AM

Next step will be doing some deeper analysis to those data...