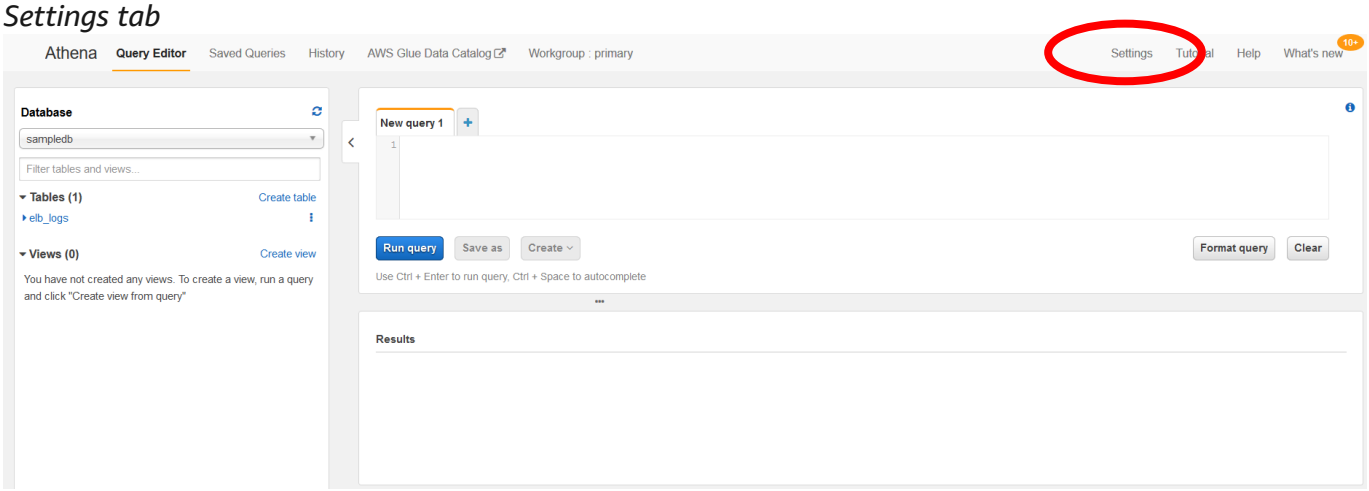
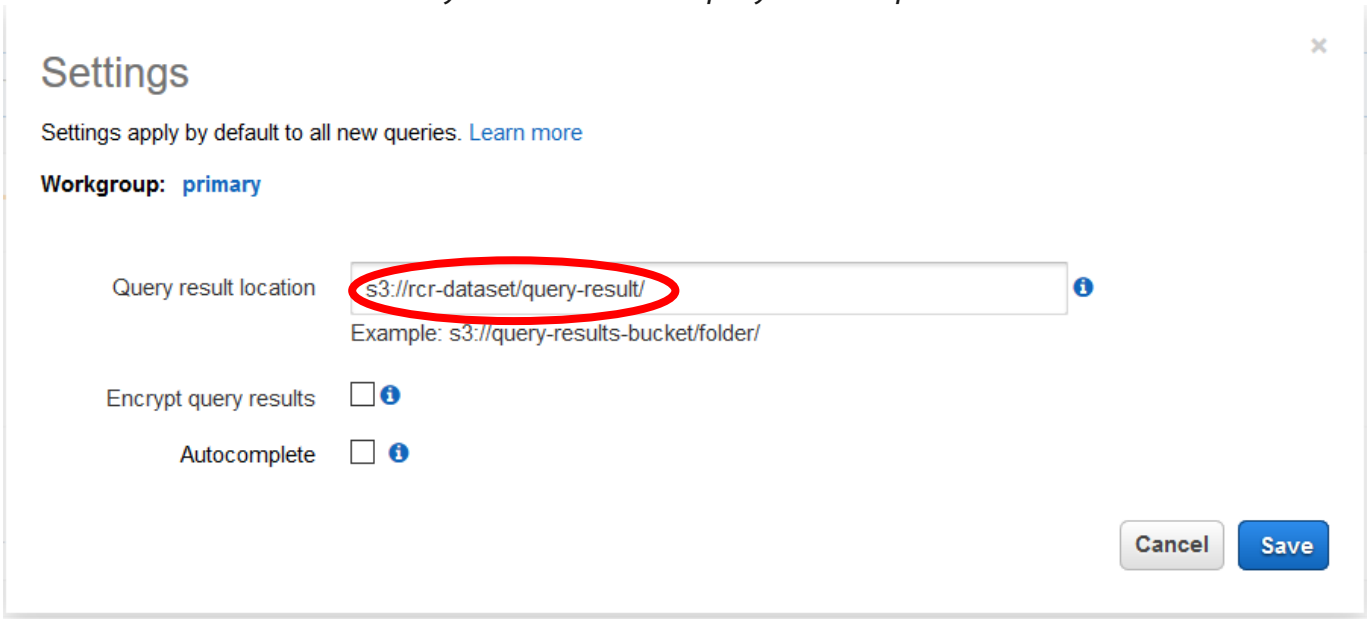
Section 2: Connecting Athena to the NOAA data repository

In this section, you create an Athena table to the NOAA data repository on Registry of Open Data on AWS. Some of these directions require the use of SQL statements. These statements can be found in the git repo under the file: sql-statements.sql. In that file you will see the Section (2 in this case) along with a .number. The number represents the specific instruction that aligns with that statement.

1) *Log on to the AWS console and change your region to N. Virginia*
2) *Search for Athena and select that service*
3) *If you encounter the "Get Started" page, click the "Get Started" button to go to the Athena Dashboard page*
4) *First, you need to specify the location that Athena can store the query results. Click on the Settings tab*



5) *Enter the bucket name and folder you created for the query-result in previous section*



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6) *Create a database to put your tables in. In the query editor, type:*

```
CREATE DATABASE ghcn
```

7) *Click "Run Query". You should see a confirmation in the Results section of "Query successful". You can also press Ctrl+Enter to run the query*

8) *On the left-hand side, change the database to the database you just created (ghcn), click on the "+" sign to create a new query. Paste this query into the query editor:*

```
CREATE EXTERNAL TABLE ghcntable(
 id string,
 year_date string,
 element string,
 data_value string,
 m_flag string,
 q_flag string,
 s_flag string,
 obs_time string)
ROW FORMAT DELIMITED
 FIELDS TERMINATED BY ','
STORED AS INPUTFORMAT
 'org.apache.hadoop.mapred.TextInputFormat'
OUTPUTFORMAT
 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat'
LOCATION
 's3://noaa-ghcn-pds/csv'
TBLPROPERTIES (
 'has_encrypted_data'='false',
     'transient_lastDdlTime'='1572285230')
```

9) *You will see the new table "ghcntable" on the left hand side under Tables. Click on the three vertical dots, and select "Preview Table". This will create a new query to show you the first 10 results in the table. Notice you did not have to copy or manipulate the data, prior to executing a SQL query against the repository in S3. You are connecting to the noaa-ghcn-pds dataset that resides in another account, using the Athena SQL interface.*

10) *In the previous section, we copied the file stadiums_with_stations_global.csv. into the S3 bucket. Now we are going to create a table using this data as the source data. This file contains the list of potential sites for the Deep Racer event, the latitude and longitude of the site as well as sensor id at that location. From the Athena page, click on AWS Glue Data Catalog*

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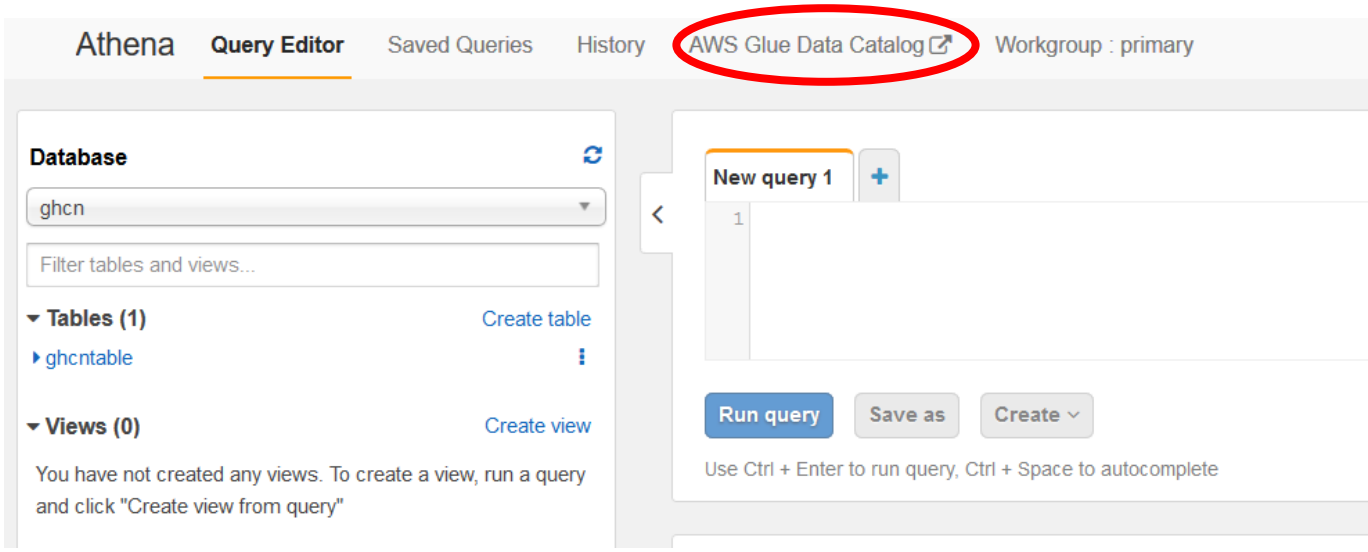
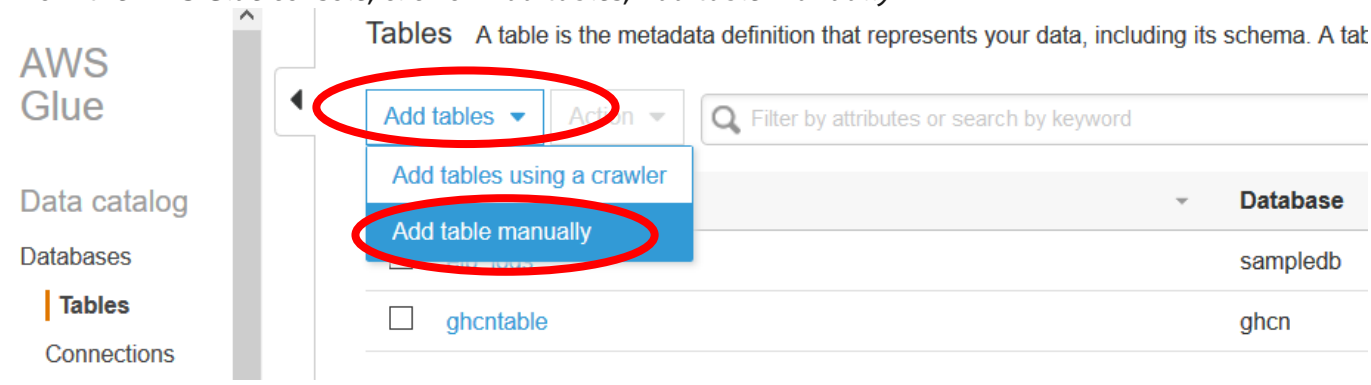
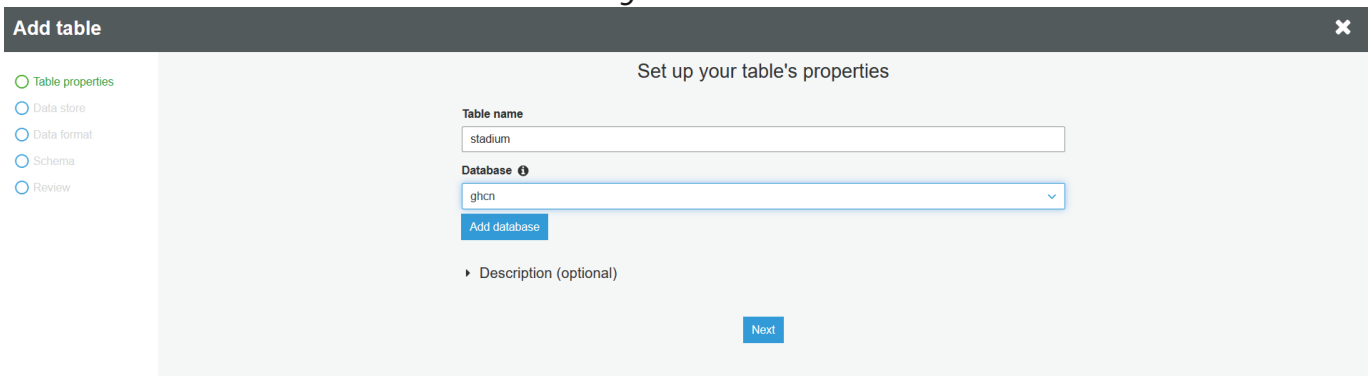


11) From the AWS Glue console, click on Add tables, Add table manually



12) Enter the table name "stadium" and select the ghcn database and click Next



13) Select "Specified path in my account" and either type in the location of your S3 bucket and folder where you saved the stadium data OR click on the folder to browse to that folder and click Next.

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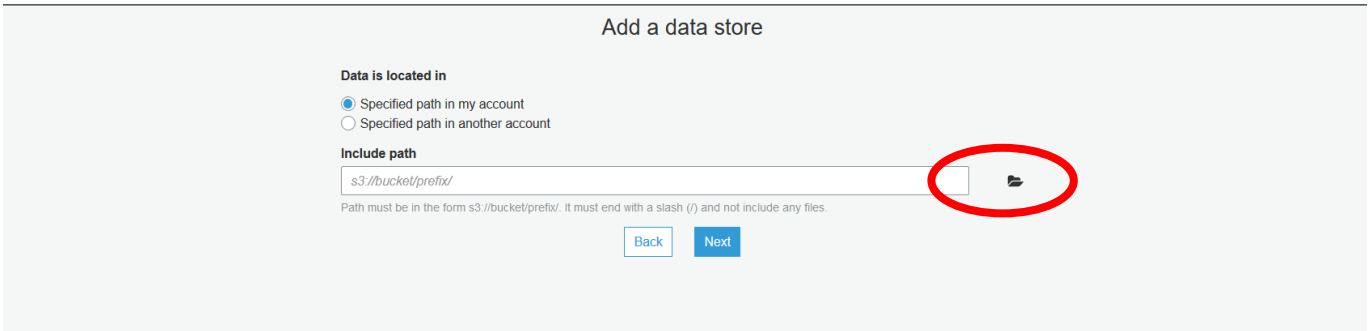

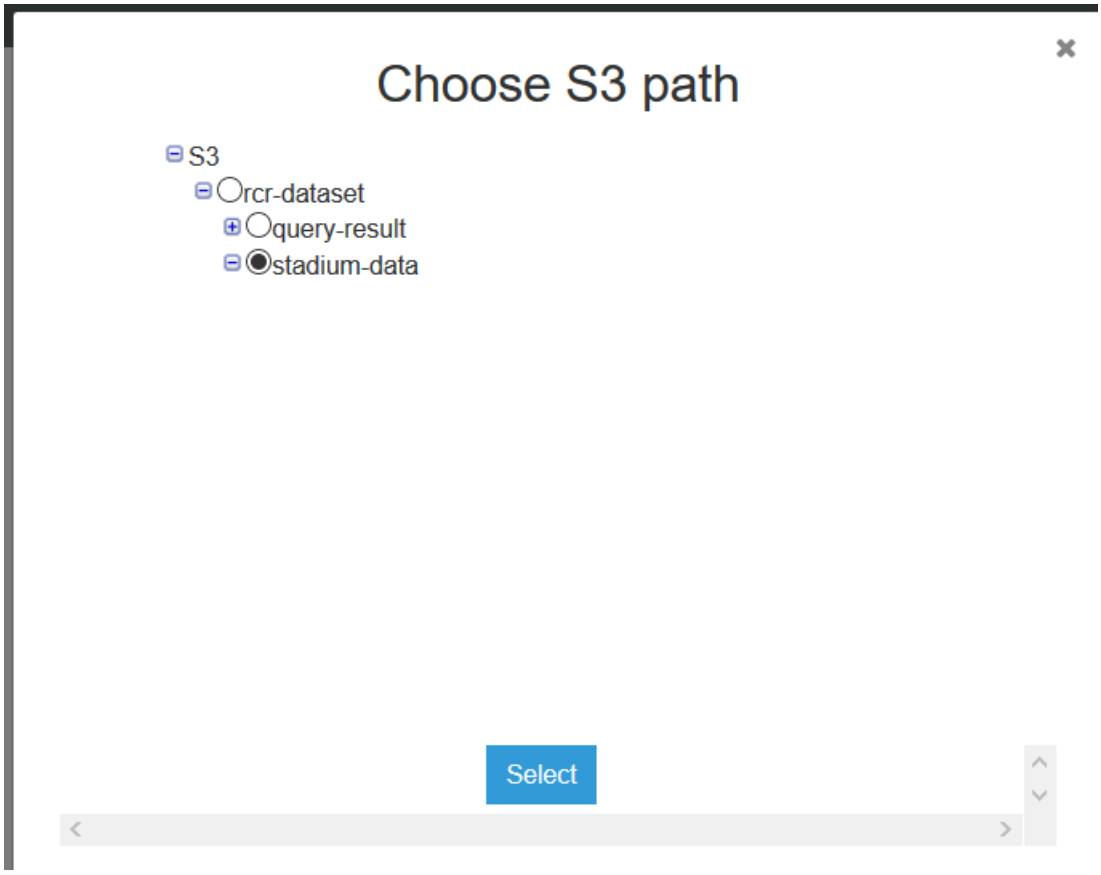

14) *Specify the Classification as "CSV" and the Delimiter as "Comma", click Next*
15) *Click on the Add Column Button and add* `city` *as a column type "String". Repeat the process for the following columns all as column type "String", then click Next:*

```
station_id
lat
lon
```

16) *Click Finish*

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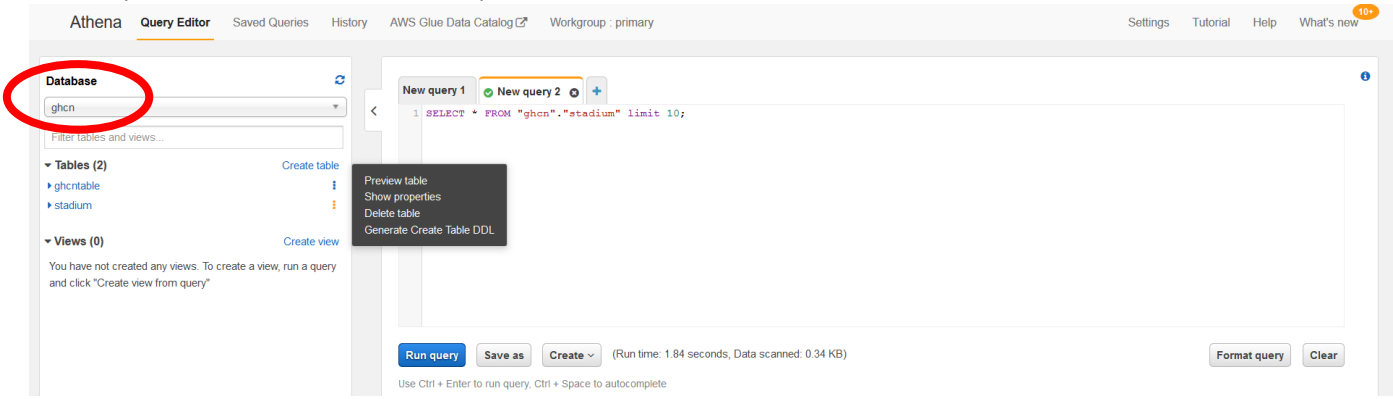
17) *Change the database in the dropdown on the left-hand side to ghcn. Navigate back to the Athena console, locate the "stadium" table, click the three vertical dots and select "Preview Table"*



18) *In the Query Editor, enter the following text to test a join across two S3 buckets in two different accounts*

```
SELECT city, station_id,element, data_value
FROM stadium
INNER JOIN ghcntable
ON stadium.station_id = ghcntable.id
WHERE ghcntable.year_date >= '20191029'
AND (
  ghcntable.element = 'TMIN' OR ghcntable.element = 'TMAX')
```

19) *Click "Run Query". You should see the results of the query*

This section is now complete, you can move on to the next section.

In this section you created an Athena database, with two tables. One table (the stadium table) was built using Glue and a .csv file in an S3 bucket you created. The other table was created with a SQL statement, referencing another S3 bucket, in a different account. That S3 bucket is updated daily with new weather data for it's global sensors.

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