

**All steps are performed after one enters the Peel system.**

```
[[az1932@hlog-2 ~]$ beeline ]  
WARNING: Use "yarn jar" to launch YARN applications.  
SLF4J: Class path contains multiple SLF4J bindings.  
SLF4J: Found binding in [jar:file:/opt/cloudera/parcels/CDH-6.3.4-1.cdh6.3.4.p0.  
6626826/jars/log4j-slf4j-impl-2.8.2.jar!/org/slf4j/impl/StaticLoggerBinder.class  
]  
SLF4J: Found binding in [jar:file:/opt/cloudera/parcels/CDH-6.3.4-1.cdh6.3.4.p0.  
6626826/jars/slf4j-log4j12-1.7.25.jar!/org/slf4j/impl/StaticLoggerBinder.class]  
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.  
SLF4J: Actual binding is of type [org.apache.logging.slf4j.Log4jLoggerFactory]  
Beeline version 2.1.1-cdh6.3.4 by Apache Hive
```

```
beeline> !connect jdbc:hive2://hm-1.hpc.nyu.edu:10000/  
Connecting to jdbc:hive2://hm-1.hpc.nyu.edu:10000/  
Enter username for jdbc:hive2://hm-1.hpc.nyu.edu:10000/: az1932  
Enter password for jdbc:hive2://hm-1.hpc.nyu.edu:10000/: *****  
Connected to: Apache Hive (version 2.1.1-cdh6.3.4)  
Driver: Hive JDBC (version 2.1.1-cdh6.3.4)  
Transaction isolation: TRANSACTION_REPEATABLE_READ  
0: jdbc:hive2://hm-1.hpc.nyu.edu:10000/>
```

```
[0: jdbc:hive2://hm-1.hpc.nyu.edu:10000/> use az1932;  
INFO : Compiling command(queryId=hive_20211120235302_16f8c578-d6ea-446f-a4c5-52  
7b0500d93d): use az1932  
INFO : Semantic Analysis Completed  
INFO : Returning Hive schema: Schema(fieldSchemas:null, properties:null)  
INFO : Completed compiling command(queryId=hive_20211120235302_16f8c578-d6ea-44  
6f-a4c5-527b0500d93d); Time taken: 0.167 seconds  
INFO : Executing command(queryId=hive_20211120235302_16f8c578-d6ea-446f-a4c5-52  
7b0500d93d): use az1932  
INFO : Starting task [Stage-0:DDL] in serial mode  
INFO : Completed executing command(queryId=hive_20211120235302_16f8c578-d6ea-44  
6f-a4c5-527b0500d93d); Time taken: 0.002 seconds  
INFO : OK  
No rows affected (0.204 seconds)
```

**After all necessary Hive tables (mag\_data, cycle23, cycle24, cycle25) are created (please refers the creation of tables to profiling\_code/profiling\_sunMag/hive\_sunmag.txt)**

```
[0: jdbc:hive2://hm-1.hpc.nyu.edu:10000> show tables;
INFO : Compiling command(queryId=hive_20211120235326_39bde5ff-5077-440e-aa8c-26
75d1aa74de): show tables
INFO : Semantic Analysis Completed
INFO : Returning Hive schema: Schema(fieldSchemas:[FieldSchema(name:tab_name, t
ype:string, comment:from deserializer)], properties:null)
INFO : Completed compiling command(queryId=hive_20211120235326_39bde5ff-5077-44
0e-aa8c-2675d1aa74de); Time taken: 0.034 seconds
INFO : Executing command(queryId=hive_20211120235326_39bde5ff-5077-440e-aa8c-26
75d1aa74de): show tables
INFO : Starting task [Stage-0:DDL] in serial mode
INFO : Completed executing command(queryId=hive_20211120235326_39bde5ff-5077-44
0e-aa8c-2675d1aa74de); Time taken: 0.021 seconds
INFO : OK
+-----+
|   tab_name   |
+-----+
| cycle23     |
| cycle24     |
| cycle25     |
| drivers      |
| mag_data    |
| timesheet   |
| weather      |
| weather2    |
| weather_alt |
+-----+
9 rows selected (0.088 seconds)
```

**Note that each cycle represents a range of 11 years of the change of solar magnetic field strength.**

**In reality, the year 1992 is not the beginning of Solar Cycle 23, but to simplify the process of proving the existence of a cycle, 1992 is used as a beginning point of Solar Cycle 23.**

**The main purpose of analysis in Hive is to examine the maximum, minimum, and average magnetic field of each cycle from 1992-2020.**

## MAX, MIN, AVG of cycle23

---

```
fd47605c3a): SELECT MAX(mag_strength) FROM cycle23
WARN  :
INFO  : Query ID = hive_20211121000057_a5be7e05-19c3-4d40-a3b8-90fd47605c3a
INFO  : Total jobs = 1
INFO  : Launching Job 1 out of 1
INFO  : Starting task [Stage-1:MAPRED] in serial mode
INFO  : Number of reduce tasks determined at compile time: 1
INFO  : In order to change the average load for a reducer (in bytes):
INFO  :   set hive.exec.reducers.bytes.per.reducer=<number>
INFO  : In order to limit the maximum number of reducers:
INFO  :   set hive.exec.reducers.max=<number>
INFO  : In order to set a constant number of reducers:
INFO  :   set mapreduce.job.reduces=<number>
INFO  : number of splits:1
INFO  : Submitting tokens for job: job_1622566668497_36025
INFO  : Executing with tokens: []
INFO  : The url to track the job: http://horton.hpc.nyu.edu:8088/proxy/application_1622566668497_36025/
INFO  : Starting Job = job_1622566668497_36025, Tracking URL = http://horton.hpc.nyu.edu:8088/proxy/application_1622566668497_36025/
INFO  : Kill Command = /opt/cloudera/parcels/CDH-6.3.4-1.cdh6.3.4.p0.6626826/lib/hadoop/bin/hadoop job -kill job_1622566668497_36025
INFO  : Hadoop job information for Stage-1: number of mappers: 1; number of reducers: 1
INFO  : 2021-11-21 00:01:03,892 Stage-1 map = 0%,  reduce = 0%
INFO  : 2021-11-21 00:01:09,020 Stage-1 map = 100%,  reduce = 0%, Cumulative CPU 1.96 sec
INFO  : 2021-11-21 00:01:15,099 Stage-1 map = 100%,  reduce = 100%, Cumulative CPU 4.66 sec
INFO  : MapReduce Total cumulative CPU time: 4 seconds 660 msec
INFO  : Ended Job = job_1622566668497_36025
INFO  : MapReduce Jobs Launched:
INFO  : Stage-Stage-1: Map: 1 Reduce: 1 Cumulative CPU: 4.66 sec    HDFS Read: 61859 HDFS Write: 103 HDFS EC Read: 0 SUCCESS
INFO  : Total MapReduce CPU Time Spent: 4 seconds 660 msec
INFO  : Completed executing command(queryId=hive_20211121000057_a5be7e05-19c3-4d40-a3b8-90fd47605c3a); Time taken: 18.197 seconds
INFO  : OK
+----+
| _c0 |
+----+
| 174 |
+----+
1 row selected (18.309 seconds)
```

```

[0: jdbc:hive2://hm-1.hpc.nyu.edu:10000> SELECT MIN(mag_strength) FROM cycle23;
INFO  : Compiling command(queryId=hive_20211121000150_a2a3fba7-54e6-43ba-9889-6d
a94633d3c2): SELECT MIN(mag_strength) FROM cycle23
INFO  : Semantic Analysis Completed
INFO  : Returning Hive schema: Schema(fieldSchemas:[FieldSchema(name:_c0, type:i
nt, comment:null)], properties:null)
INFO  : Completed compiling command(queryId=hive_20211121000150_a2a3fba7-54e6-43
ba-9889-6da94633d3c2); Time taken: 0.098 seconds
INFO  : Executing command(queryId=hive_20211121000150_a2a3fba7-54e6-43ba-9889-6d
a94633d3c2): SELECT MIN(mag_strength) FROM cycle23
WARN  :
INFO  : Query ID = hive_20211121000150_a2a3fba7-54e6-43ba-9889-6da94633d3c2
INFO  : Total jobs = 1
INFO  : Launching Job 1 out of 1
INFO  : Starting task [Stage-1:MAPRED] in serial mode
INFO  : Number of reduce tasks determined at compile time: 1
INFO  : In order to change the average load for a reducer (in bytes):
INFO  :   set hive.exec.reducers.bytes.per.reducer=<number>
INFO  : In order to limit the maximum number of reducers:
INFO  :   set hive.exec.reducers.max=<number>
INFO  : In order to set a constant number of reducers:
INFO  :   set mapreduce.job.reduces=<number>
INFO  : number of splits:1
INFO  : Submitting tokens for job: job_1622566668497_36027
INFO  : Executing with tokens: []
INFO  : The url to track the job: http://horton.hpc.nyu.edu:8088/proxy/applicati
on_1622566668497_36027/
INFO  : Starting Job = job_1622566668497_36027, Tracking URL = http://horton.hpc
.nyu.edu:8088/proxy/application_1622566668497_36027/
INFO  : Kill Command = /opt/cloudera/parcels/CDH-6.3.4-1.cdh6.3.4.p0.6626826/lib
/hadoop/bin/hadoop job -kill job_1622566668497_36027
INFO  : Hadoop job information for Stage-1: number of mappers: 1; number of redu
cers: 1
INFO  : 2021-11-21 00:01:56,640 Stage-1 map = 0%,  reduce = 0%
INFO  : 2021-11-21 00:02:01,703 Stage-1 map = 100%,  reduce = 0%, Cumulative CPU
 2.04 sec
INFO  : 2021-11-21 00:02:07,771 Stage-1 map = 100%,  reduce = 100%, Cumulative C
PU 6.62 sec
INFO  : MapReduce Total cumulative CPU time: 6 seconds 620 msec
INFO  : Ended Job = job_1622566668497_36027
INFO  : MapReduce Jobs Launched:
INFO  : Stage-Stage-1: Map: 1 Reduce: 1 Cumulative CPU: 6.62 sec    HDFS Read:
 61963 HDFS Write: 104 HDFS EC Read: 0 SUCCESS
INFO  : Total MapReduce CPU Time Spent: 6 seconds 620 msec
INFO  : Completed executing command(queryId=hive_20211121000150_a2a3fba7-54e6-43
ba-9889-6da94633d3c2); Time taken: 18.031 seconds
INFO  : OK
+----+
| _c0 |
+----+
| -159 |
+----+

```

```

[0: jdbc:hive2://hm-1.hpc.nyu.edu:10000> SELECT AVG(mag_strength) FROM cycle23;
INFO : Compiling command(queryId=hive_20211121000253_309cf9ad-516d-4c9d-86e7-d4
1f67a2e1b3): SELECT AVG(mag_strength) FROM cycle23
INFO : Semantic Analysis Completed
INFO : Returning Hive schema: Schema(fieldSchemas:[FieldSchema(name:_c0, type:d
ouble, comment:null)], properties:null)
INFO : Completed compiling command(queryId=hive_20211121000253_309cf9ad-516d-4c
9d-86e7-d41f67a2e1b3); Time taken: 0.095 seconds
INFO : Executing command(queryId=hive_20211121000253_309cf9ad-516d-4c9d-86e7-d4
1f67a2e1b3): SELECT AVG(mag_strength) FROM cycle23
WARN :
INFO : Query ID = hive_20211121000253_309cf9ad-516d-4c9d-86e7-d41f67a2e1b3
INFO : Total jobs = 1
INFO : Launching Job 1 out of 1
INFO : Starting task [Stage-1:MAPRED] in serial mode
INFO : Number of reduce tasks determined at compile time: 1
INFO : In order to change the average load for a reducer (in bytes):
INFO :   set hive.exec.reducers.bytes.per.reducer=<number>
INFO : In order to limit the maximum number of reducers:
INFO :   set hive.exec.reducers.max=<number>
INFO : In order to set a constant number of reducers:
INFO :   set mapreduce.job.reduces=<number>
INFO : number of splits:1
INFO : Submitting tokens for job: job_1622566668497_36028
INFO : Executing with tokens: []
INFO : The url to track the job: http://horton.hpc.nyu.edu:8088/proxy/applicati
on_1622566668497_36028/
INFO : Starting Job = job_1622566668497_36028, Tracking URL = http://horton.hpc
.nyu.edu:8088/proxy/application_1622566668497_36028/
INFO : Kill Command = /opt/cloudera/parcels/CDH-6.3.4-1.cdh6.3.4.p0.6626826/lib
/hadoop/bin/hadoop job -kill job_1622566668497_36028
INFO : Hadoop job information for Stage-1: number of mappers: 1; number of redu
cers: 1
INFO : 2021-11-21 00:02:59,160 Stage-1 map = 0%, reduce = 0%
INFO : 2021-11-21 00:03:04,227 Stage-1 map = 100%, reduce = 0%, Cumulative CPU
1.93 sec
INFO : 2021-11-21 00:03:09,284 Stage-1 map = 100%, reduce = 100%, Cumulative C
PU 6.38 sec
INFO : MapReduce Total cumulative CPU time: 6 seconds 380 msec
INFO : Ended Job = job_1622566668497_36028
INFO : MapReduce Jobs Launched:
INFO : Stage-Stage-1: Map: 1 Reduce: 1 Cumulative CPU: 6.38 sec HDFS Read:
62417 HDFS Write: 118 HDFS EC Read: 0 SUCCESS
INFO : Total MapReduce CPU Time Spent: 6 seconds 380 msec
INFO : Completed executing command(queryId=hive_20211121000253_309cf9ad-516d-4c
9d-86e7-d41f67a2e1b3); Time taken: 16.99 seconds
INFO : OK
+-----+
|      _c0      |
+-----+
| 2.7226970560303894 |
+-----+
1 row selected (17.101 seconds)

```

## MAX, MIN, AVG of cycle24

```
0: jdbc:hive2://hm-1.hpc.nyu.edu:10000> SELECT MAX(mag_strength) FROM cycle24;
INFO : Compiling command(queryId=hive_20211121000426_f146759d-d860-448e-890f-28c82b736f20): SELECT MAX(mag_strength) FROM cycle24
INFO : Semantic Analysis Completed
INFO : Returning Hive schema: Schema(fieldSchemas:[FieldSchema(name:_c0, type:int, comment:null)], properties:null)
INFO : Completed compiling command(queryId=hive_20211121000426_f146759d-d860-448e-890f-28c82b736f20); Time taken: 0.117 seconds
INFO : Executing command(queryId=hive_20211121000426_f146759d-d860-448e-890f-28c82b736f20): SELECT MAX(mag_strength) FROM cycle24
WARN :
INFO : Query ID = hive_20211121000426_f146759d-d860-448e-890f-28c82b736f20
INFO : Total jobs = 1
INFO : Launching Job 1 out of 1
INFO : Starting task [Stage-1:MAPRED] in serial mode
INFO : Number of reduce tasks determined at compile time: 1
INFO : In order to change the average load for a reducer (in bytes):
INFO :   set hive.exec.reducers.bytes.per.reducer=<number>
INFO : In order to limit the maximum number of reducers:
INFO :   set hive.exec.reducers.max=<number>
INFO : In order to set a constant number of reducers:
INFO :   set mapreduce.job.reduces=<number>
INFO : number of splits:1
INFO : Submitting tokens for job: job_1622566668497_36030
INFO : Executing with tokens: []
INFO : The url to track the job: http://horton.hpc.nyu.edu:8088/proxy/application_1622566668497_36030/
INFO : Starting Job = job_1622566668497_36030, Tracking URL = http://horton.hpc.nyu.edu:8088/proxy/application_1622566668497_36030/
INFO : Kill Command = /opt/cloudera/parcels/CDH-6.3.4-1.cdh6.3.4.p0.6626826/lib/hadoop/bin/hadoop job -kill job_1622566668497_36030
INFO : Hadoop job information for Stage-1: number of mappers: 1; number of reducers: 1
INFO : 2021-11-21 00:04:33,706 Stage-1 map = 0%, reduce = 0%
INFO : 2021-11-21 00:04:38,772 Stage-1 map = 100%, reduce = 0%, Cumulative CPU 1.89 sec
INFO : 2021-11-21 00:04:46,861 Stage-1 map = 100%, reduce = 100%, Cumulative CPU 6.39 sec
INFO : MapReduce Total cumulative CPU time: 6 seconds 390 msec
INFO : Ended Job = job_1622566668497_36030
INFO : MapReduce Jobs Launched:
INFO : Stage-Stage-1: Map: 1 Reduce: 1 Cumulative CPU: 6.39 sec    HDFS Read: 50493 HDFS Write: 103 HDFS EC Read: 0 SUCCESS
INFO : Total MapReduce CPU Time Spent: 6 seconds 390 msec
INFO : Completed executing command(queryId=hive_20211121000426_f146759d-d860-448e-890f-28c82b736f20); Time taken: 21.121 seconds
INFO : OK
+---+
| _c0 |
+---+
| 120 |
+---+
1 row selected (21.25 seconds)
```

```

0: jdbc:hive2://hm-1.hpc.nyu.edu:10000/> SELECT MIN(mag_strength) FROM cycle24; ]
INFO  : Compiling command(queryId=hive_20211121000614_749ab26a-626b-47a1-9639-1c
3f538cd9f1): SELECT MIN(mag_strength) FROM cycle24
INFO  : Semantic Analysis Completed
INFO  : Returning Hive schema: Schema(fieldSchemas:[FieldSchema(name:_c0, type:i
nt, comment:null)], properties:null)
INFO  : Completed compiling command(queryId=hive_20211121000614_749ab26a-626b-47
a1-9639-1c3f538cd9f1); Time taken: 0.113 seconds
INFO  : Executing command(queryId=hive_20211121000614_749ab26a-626b-47a1-9639-1c
3f538cd9f1): SELECT MIN(mag_strength) FROM cycle24
WARN  :
INFO  : Query ID = hive_20211121000614_749ab26a-626b-47a1-9639-1c3f538cd9f1
INFO  : Total jobs = 1
INFO  : Launching Job 1 out of 1
INFO  : Starting task [Stage-1:MAPRED] in serial mode
INFO  : Number of reduce tasks determined at compile time: 1
INFO  : In order to change the average load for a reducer (in bytes):
INFO  :   set hive.exec.reducers.bytes.per.reducer=<number>
INFO  : In order to limit the maximum number of reducers:
INFO  :   set hive.exec.reducers.max=<number>
INFO  : In order to set a constant number of reducers:
INFO  :   set mapreduce.job.reduces=<number>
INFO  : number of splits:1
INFO  : Submitting tokens for job: job_1622566668497_36031
INFO  : Executing with tokens: []
INFO  : The url to track the job: http://horton.hpc.nyu.edu:8088/proxy/applicati
on_1622566668497_36031/
INFO  : Starting Job = job_1622566668497_36031, Tracking URL = http://horton.hpc
.ny.edu:8088/proxy/application_1622566668497_36031/
INFO  : Kill Command = /opt/cloudera/parcels/CDH-6.3.4-1.cdh6.3.4.p0.6626826/lib
/hadoop/bin/hadoop job -kill job_1622566668497_36031
INFO  : Hadoop job information for Stage-1: number of mappers: 1; number of redu
cers: 1
INFO  : 2021-11-21 00:06:20,675 Stage-1 map = 0%, reduce = 0%
INFO  : 2021-11-21 00:06:25,747 Stage-1 map = 100%, reduce = 0%, Cumulative CPU
1.92 sec
INFO  : 2021-11-21 00:06:31,816 Stage-1 map = 100%, reduce = 100%, Cumulative C
PU 6.57 sec
INFO  : MapReduce Total cumulative CPU time: 6 seconds 570 msec
INFO  : Ended Job = job_1622566668497_36031
INFO  : MapReduce Jobs Launched:
INFO  : Stage-Stage-1: Map: 1 Reduce: 1 Cumulative CPU: 6.57 sec    HDFS Read:
50597 HDFS Write: 104 HDFS EC Read: 0 SUCCESS
INFO  : Total MapReduce CPU Time Spent: 6 seconds 570 msec
INFO  : Completed executing command(queryId=hive_20211121000614_749ab26a-626b-47
a1-9639-1c3f538cd9f1); Time taken: 18.206 seconds
INFO  : OK
+----+
| _c0 |
+----+
| -117 |
+----+
1 row selected (18.33 seconds)

```

```

[0: jdbc:hive2://hm-1.hpc.nyu.edu:10000/> SELECT AVG(mag_strength) FROM cycle24;
INFO  : Compiling command(queryId=hive_20211121000705_cd242c0a-8f18-4ebf-98af-c0
9af3dfd205): SELECT AVG(mag_strength) FROM cycle24
INFO  : Semantic Analysis Completed
INFO  : Returning Hive schema: Schema(fieldSchemas:[FieldSchema(name:_c0, type:d
ouble, comment:null)], properties:null)
INFO  : Completed compiling command(queryId=hive_20211121000705_cd242c0a-8f18-4e
bf-98af-c09af3dfd205); Time taken: 0.108 seconds
INFO  : Executing command(queryId=hive_20211121000705_cd242c0a-8f18-4ebf-98af-c0
9af3dfd205): SELECT AVG(mag_strength) FROM cycle24
WARN  :
INFO  : Query ID = hive_20211121000705_cd242c0a-8f18-4ebf-98af-c09af3dfd205
INFO  : Total jobs = 1
INFO  : Launching Job 1 out of 1
INFO  : Starting task [Stage-1:MAPRED] in serial mode
INFO  : Number of reduce tasks determined at compile time: 1
INFO  : In order to change the average load for a reducer (in bytes):
INFO  :   set hive.exec.reducers.bytes.per.reducer=<number>
INFO  : In order to limit the maximum number of reducers:
INFO  :   set hive.exec.reducers.max=<number>
INFO  : In order to set a constant number of reducers:
INFO  :   set mapreduce.job.reduces=<number>
INFO  : number of splits:1
INFO  : Submitting tokens for job: job_1622566668497_36032
INFO  : Executing with tokens: []
INFO  : The url to track the job: http://horton.hpc.nyu.edu:8088/proxy/applicati
on_1622566668497_36032/
INFO  : Starting Job = job_1622566668497_36032, Tracking URL = http://horton.hpc
.nyu.edu:8088/proxy/application_1622566668497_36032/
INFO  : Kill Command = /opt/cloudera/parcels/CDH-6.3.4-1.cdh6.3.4.p0.6626826/lib
/hadoop/bin/hadoop job -kill job_1622566668497_36032
INFO  : Hadoop job information for Stage-1: number of mappers: 1; number of redu
cers: 1
INFO  : 2021-11-21 00:07:18,117 Stage-1 map = 0%,  reduce = 0%
INFO  : 2021-11-21 00:07:23,183 Stage-1 map = 100%,  reduce = 0%, Cumulative CPU
2.0 sec
INFO  : 2021-11-21 00:07:29,263 Stage-1 map = 100%,  reduce = 100%, Cumulative C
PU 4.9 sec
INFO  : MapReduce Total cumulative CPU time: 4 seconds 900 msec
INFO  : Ended Job = job_1622566668497_36032
INFO  : MapReduce Jobs Launched:
INFO  : Stage-Stage-1: Map: 1 Reduce: 1 Cumulative CPU: 4.9 sec    HDFS Read:
51050 HDFS Write: 119 HDFS EC Read: 0 SUCCESS
INFO  : Total MapReduce CPU Time Spent: 4 seconds 900 msec
INFO  : Completed executing command(queryId=hive_20211121000705_cd242c0a-8f18-4e
bf-98af-c09af3dfd205); Time taken: 24.969 seconds
INFO  : OK
+-----+
|      _c0      |
+-----+
| -2.7487804878048783 |
+-----+
1 row selected (25.089 seconds)

```

## MAX, MIN, AVG of cycle25

```
[0: jdbc:hive2://hm-1.hpc.nyu.edu:10000> SELECT MAX(mag_strength) FROM cycle25;
INFO : Compiling command(queryId=hive_20211121000835_b72eb301-edc0-4b3b-addd-86df8eb46b57): SELECT MAX(mag_strength) FROM cycle25
INFO : Semantic Analysis Completed
INFO : Returning Hive schema: Schema(fieldSchemas:[FieldSchema(name:_c0, type:int, comment:null)], properties:null)
INFO : Completed compiling command(queryId=hive_20211121000835_b72eb301-edc0-4b3b-addd-86df8eb46b57); Time taken: 0.105 seconds
INFO : Executing command(queryId=hive_20211121000835_b72eb301-edc0-4b3b-addd-86df8eb46b57): SELECT MAX(mag_strength) FROM cycle25
WARN :
INFO : Query ID = hive_20211121000835_b72eb301-edc0-4b3b-addd-86df8eb46b57
INFO : Total jobs = 1
INFO : Launching Job 1 out of 1
INFO : Starting task [Stage-1:MAPRED] in serial mode
INFO : Number of reduce tasks determined at compile time: 1
INFO : In order to change the average load for a reducer (in bytes):
INFO :   set hive.exec.reducers.bytes.per.reducer=<number>
INFO : In order to limit the maximum number of reducers:
INFO :   set hive.exec.reducers.max=<number>
INFO : In order to set a constant number of reducers:
INFO :   set mapreduce.job.reduces=<number>
INFO : number of splits:1
INFO : Submitting tokens for job: job_1622566668497_36034
INFO : Executing with tokens: []
INFO : The url to track the job: http://horton.hpc.nyu.edu:8088/proxy/application_1622566668497_36034/
INFO : Starting Job = job_1622566668497_36034, Tracking URL = http://horton.hpc.nyu.edu:8088/proxy/application_1622566668497_36034/
INFO : Kill Command = /opt/cloudera/parcels/CDH-6.3.4-1.cdh6.3.4.p0.6626826/lib/hadoop/bin/hadoop job -kill job_1622566668497_36034
INFO : Hadoop job information for Stage-1: number of mappers: 1; number of reducers: 1
INFO : 2021-11-21 00:08:40,479 Stage-1 map = 0%, reduce = 0%
INFO : 2021-11-21 00:08:46,554 Stage-1 map = 100%, reduce = 0%, Cumulative CPU 1.86 sec
INFO : 2021-11-21 00:08:52,624 Stage-1 map = 100%, reduce = 100%, Cumulative CPU 6.19 sec
INFO : MapReduce Total cumulative CPU time: 6 seconds 190 msec
INFO : Ended Job = job_1622566668497_36034
INFO : MapReduce Jobs Launched:
INFO : Stage-Stage-1: Map: 1 Reduce: 1 Cumulative CPU: 6.19 sec HDFS Read: 41995 HDFS Write: 103 HDFS EC Read: 0 SUCCESS
INFO : Total MapReduce CPU Time Spent: 6 seconds 190 msec
INFO : Completed executing command(queryId=hive_20211121000835_b72eb301-edc0-4b3b-addd-86df8eb46b57); Time taken: 18.19 seconds
INFO : OK
+-----+
| _c0 |
+-----+
| 200 |
+-----+
1 row selected (18.307 seconds)
```

```
[0: jdbc:hive2://hm-1.hpc.nyu.edu:10000/> SELECT MIN(mag_strength) FROM cycle25; ]
INFO : Compiling command(queryId=hive_20211121000925_ae3b223c-ccea-4399-b2c0-fc
29152f5fa3): SELECT MIN(mag_strength) FROM cycle25
INFO : Semantic Analysis Completed
INFO : Returning Hive schema: Schema(fieldSchemas:[FieldSchema(name:_c0, type:i
nt, comment:null)], properties:null)
INFO : Completed compiling command(queryId=hive_20211121000925_ae3b223c-ccea-43
99-b2c0-fc29152f5fa3); Time taken: 0.095 seconds
INFO : Executing command(queryId=hive_20211121000925_ae3b223c-ccea-4399-b2c0-fc
29152f5fa3): SELECT MIN(mag_strength) FROM cycle25
WARN :
INFO : Query ID = hive_20211121000925_ae3b223c-ccea-4399-b2c0-fc29152f5fa3
INFO : Total jobs = 1
INFO : Launching Job 1 out of 1
INFO : Starting task [Stage-1:MAPRED] in serial mode
INFO : Number of reduce tasks determined at compile time: 1
INFO : In order to change the average load for a reducer (in bytes):
INFO :   set hive.exec.reducers.bytes.per.reducer=<number>
INFO : In order to limit the maximum number of reducers:
INFO :   set hive.exec.reducers.max=<number>
INFO : In order to set a constant number of reducers:
INFO :   set mapreduce.job.reduces=<number>
INFO : number of splits:1
INFO : Submitting tokens for job: job_1622566668497_36035
INFO : Executing with tokens: []
INFO : The url to track the job: http://horton.hpc.nyu.edu:8088/proxy/applicati
on_1622566668497_36035/
INFO : Starting Job = job_1622566668497_36035, Tracking URL = http://horton.hpc
.nyu.edu:8088/proxy/application_1622566668497_36035/
INFO : Kill Command = /opt/cloudera/parcels/CDH-6.3.4-1.cdh6.3.4.p0.6626826/lib
/hadoop/bin/hadoop job -kill job_1622566668497_36035
INFO : Hadoop job information for Stage-1: number of mappers: 1; number of redu
cers: 1
INFO : 2021-11-21 00:09:30,247 Stage-1 map = 0%, reduce = 0%
INFO : 2021-11-21 00:09:36,324 Stage-1 map = 100%, reduce = 0%, Cumulative CPU
1.86 sec
INFO : 2021-11-21 00:09:41,382 Stage-1 map = 100%, reduce = 100%, Cumulative C
PU 5.48 sec
INFO : MapReduce Total cumulative CPU time: 5 seconds 480 msec
INFO : Ended Job = job_1622566668497_36035
INFO : MapReduce Jobs Launched:
INFO : Stage-Stage-1: Map: 1 Reduce: 1 Cumulative CPU: 5.48 sec HDFS Read:
42099 HDFS Write: 104 HDFS EC Read: 0 SUCCESS
INFO : Total MapReduce CPU Time Spent: 5 seconds 480 msec
INFO : Completed executing command(queryId=hive_20211121000925_ae3b223c-ccea-43
99-b2c0-fc29152f5fa3); Time taken: 17.148 seconds
INFO : OK
+-----+
| _c0 |
+-----+
| -107 |
+-----+
1 row selected (17.255 seconds)
```

```

[0: jdbc:hive2://hm-1.hpc.nyu.edu:10000> SELECT AVG(mag_strength) FROM cycle25;
INFO : Compiling command(queryId=hive_20211121001031_333b5ab2-c921-40b2-a480-2d
93b43a2e92): SELECT AVG(mag_strength) FROM cycle25
INFO : Semantic Analysis Completed
INFO : Returning Hive schema: Schema(fieldSchemas:[FieldSchema(name:_c0, type:d
ouble, comment:null)], properties:null)
INFO : Completed compiling command(queryId=hive_20211121001031_333b5ab2-c921-40
b2-a480-2d93b43a2e92); Time taken: 0.087 seconds
INFO : Executing command(queryId=hive_20211121001031_333b5ab2-c921-40b2-a480-2d
93b43a2e92): SELECT AVG(mag_strength) FROM cycle25
WARN :
INFO : Query ID = hive_20211121001031_333b5ab2-c921-40b2-a480-2d93b43a2e92
INFO : Total jobs = 1
INFO : Launching Job 1 out of 1
INFO : Starting task [Stage-1:MAPRED] in serial mode
INFO : Number of reduce tasks determined at compile time: 1
INFO : In order to change the average load for a reducer (in bytes):
INFO :   set hive.exec.reducers.bytes.per.reducer=<number>
INFO : In order to limit the maximum number of reducers:
INFO :   set hive.exec.reducers.max=<number>
INFO : In order to set a constant number of reducers:
INFO :   set mapreduce.job.reduces=<number>
INFO : number of splits:1
INFO : Submitting tokens for job: job_1622566668497_36036
INFO : Executing with tokens: []
INFO : The url to track the job: http://horton.hpc.nyu.edu:8088/proxy/applicati
on_1622566668497_36036/
INFO : Starting Job = job_1622566668497_36036, Tracking URL = http://horton.hpc
.ny.edu:8088/proxy/application_1622566668497_36036/
INFO : Kill Command = /opt/cloudera/parcels/CDH-6.3.4-1.cdh6.3.4.p0.6626826/lib
/hadoop/bin/hadoop job -kill job_1622566668497_36036
INFO : Hadoop job information for Stage-1: number of mappers: 1; number of redu
cers: 1
INFO : 2021-11-21 00:10:37,872 Stage-1 map = 0%, reduce = 0%
INFO : 2021-11-21 00:10:42,937 Stage-1 map = 100%, reduce = 0%, Cumulative CPU
1.82 sec
INFO : 2021-11-21 00:10:49,017 Stage-1 map = 100%, reduce = 100%, Cumulative C
PU 6.65 sec
INFO : MapReduce Total cumulative CPU time: 6 seconds 650 msec
INFO : Ended Job = job_1622566668497_36036
INFO : MapReduce Jobs Launched:
INFO : Stage-Stage-1: Map: 1 Reduce: 1 Cumulative CPU: 6.65 sec HDFS Read:
42553 HDFS Write: 117 HDFS EC Read: 0 SUCCESS
INFO : Total MapReduce CPU Time Spent: 6 seconds 650 msec
INFO : Completed executing command(queryId=hive_20211121001031_333b5ab2-c921-40
b2-a480-2d93b43a2e92); Time taken: 18.125 seconds
INFO : OK
+-----+
|      _c0      |
+-----+
| 2.785147127510509 |
+-----+
1 row selected (18.222 seconds)

```

**The maximum solar magnetic field strengths of all three cycles are in the range between 100 — 200 microTesla.**

**The minimum solar magnetic field strengths of all three cycles are in the range between -200 — -100 microTesla.**

**The minimum solar magnetic field strengths of cycle 23 and cycle 25 are around 2.75, yet for cycle 24, it is -2.75**