```
-- Query 1: Top Cities by Average Temperature
SELECT
  city_name,
  AVG(avg_temp_c) AS avg_temperature
FROM
  `data-225-group-project.climate_dwh.climate_fact` fact
JOIN
  `data-225-group-project.climate_dwh.location_dim` location
ON
  fact.stationid = location.station_id
GROUP BY
  city_name
ORDER BY
  avg_temperature DESC
LIMIT 20;
```

| Row | city_name | avg_temperature |
|---|---|---|
| 1 | Honolulu | 24.89408247489... |
| 2 | Phoenix | 22.91001673478... |
| 3 | Austin | 20.45615246291... |
| 4 | Tallahassee | 19.85505529485... |
| 5 | Montgomery | 18.47826236387... |
| 6 | Columbia | 17.68848571724... |
| 7 | Little Rock | 17.07175005845... |
| 8 | Atlanta | 16.77345754785... |
| 9 | Sacramento | 15.70770115343... |
| 10 | Oklahoma City | 15.67218438621... |
| 11 | Raleigh | 15.49904015468... |

```
-- Query 2: Top Cities with the Most Extreme Weather Events
SELECT
  l.city_name,
  COUNT(*) AS extreme_events_count
FROM
  `data-225-group-project.climate_dwh.climate_fact` c
JOIN
  `data-225-group-project.climate_dwh.location_dim` l
ON
  c.stationid = l.station_id
WHERE
  c.max_temp_c > 35 OR c.min_temp_c < 0 OR c.precipitation_mm > 100
GROUP BY
  l.city_name
ORDER BY
  extreme_events_count DESC
LIMIT 10;
```

| | | |
|---|---|---|
| 1 | Montpelier | 20760 |
| 2 | Cheyenne | 17977 |
| 3 | Helena | 14539 |
| 4 | Bismarck | 14457 |
| 5 | Carson City | 14426 |
| 6 | Concord | 13664 |
| 7 | Springfield | 13483 |
| 8 | Saint Paul | 12669 |
| 9 | Denver | 12603 |
| 10 | Madison | 12417 |

```
-- Query 3: Extreme Climate Events by City with Corresponding Dates
WITH ExtremeDates AS (
 SELECT
   stationid,
   MAX(max_temp_c) AS max_temperature,
   MIN(min_temp_c) AS min_temperature,
   MAX(peak_wind_gust_kmh) AS max_wind_speed,
   MAX(precipitation_mm) AS max_precipitation
 FROM
   `data-225-group-project.climate_dwh.climate_fact`
 GROUP BY
   stationid
)
SELECT
   location.city_name,
   dates.record_date AS date_max_temperature,
   dates_min.record_date AS date_min_temperature,
   dates_wind.record_date AS date_max_wind_speed,
   dates_precipitation.record_date AS date_max_precipitation,
   extreme_dates.max_temperature,
   extreme_dates.min_temperature,
   extreme_dates.max_wind_speed,
   extreme_dates.max_precipitation
FROM
   ExtremeDates extreme_dates
JOIN
   `data-225-group-project.climate_dwh.climate_fact` dates
   ON extreme_dates.stationid = dates.stationid
   AND extreme_dates.max_temperature = dates.max_temp_c
JOIN
   `data-225-group-project.climate_dwh.climate_fact` dates_min
   ON extreme_dates.stationid = dates_min.stationid
   AND extreme_dates.min_temperature = dates_min.min_temp_c
JOIN
   `data-225-group-project.climate_dwh.climate_fact` dates_wind
   ON extreme_dates.stationid = dates_wind.stationid
   AND extreme_dates.max_wind_speed = dates_wind.peak_wind_gust_kmh
JOIN
   `data-225-group-project.climate_dwh.climate_fact` dates_precipitation
   ON extreme_dates.stationid = dates_precipitation.stationid
   AND extreme_dates.max_precipitation = dates_precipitation.precipitation_mm
JOIN
   `data-225-group-project.climate_dwh.location_dim` location
```

```
  ON extreme_dates.stationid = location.station_id;
```

| Row | city_name | date_max_temperatu | date_min_temperatu | date_max_wind_spe | date_max_precipitati | max_temperature | min_temperature | max_wind_speed | max_precipitation |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Montgomery | 2007-08-14 | 1985-01-21 | 1978-04-18 | 1953-09-26 | 41.1 | -17.8 | 107.3 | 221.5 |
| 2 | Austin | 2000-09-05 | 1949-01-31 | 1987-09-10 | 2001-11-15 | 44.4 | -18.9 | 129.6 | 191.8 |
| 3 | Columbia | 2012-06-30 | 1985-01-21 | 1989-06-16 | 2015-10-04 | 42.8 | -18.3 | 126.0 | 174.5 |
| 4 | Little Rock | 2000-08-30 | 1985-01-20 | 1984-03-27 | 1988-11-18 | 43.9 | -21.1 | 0.0 | 178.1 |
| 5 | Little Rock | 2000-08-30 | 1985-01-20 | 2001-10-17 | 1988-11-18 | 43.9 | -21.1 | 0.0 | 178.1 |
| 6 | Little Rock | 2000-08-30 | 1985-01-20 | 1993-01-19 | 1988-11-18 | 43.9 | -21.1 | 0.0 | 178.1 |
| 7 | Little Rock | 2000-08-30 | 1985-01-20 | 1992-07-05 | 1988-11-18 | 43.9 | -21.1 | 0.0 | 178.1 |
| 8 | Little Rock | 2000-08-30 | 1985-01-20 | 2009-03-30 | 1988-11-18 | 43.9 | -21.1 | 0.0 | 178.1 |
| 9 | Little Rock | 2000-08-30 | 1985-01-20 | 1997-09-03 | 1988-11-18 | 43.9 | -21.1 | 0.0 | 178.1 |
| 10 | Little Rock | 2000-08-30 | 1985-01-20 | 1993-09-08 | 1988-11-18 | 43.9 | -21.1 | 0.0 | 178.1 |
| 11 | Little Rock | 2000-08-30 | 1985-01-20 | 2011-07-21 | 1988-11-18 | 43.9 | -21.1 | 0.0 | 178.1 |
| 12 | Little Rock | 2000-08-30 | 1985-01-20 | 1999-01-25 | 1988-11-18 | 43.9 | -21.1 | 0.0 | 178.1 |
| 13 | Little Rock | 2000-08-30 | 1985-01-20 | 1995-01-29 | 1988-11-18 | 43.9 | -21.1 | 0.0 | 178.1 |

```
-- Query 4: Total Greenhouse Gas Emissions by Country
SELECT
  ghgas_country,
  SUM(ghgas_id) AS total_emissions
FROM
  `data-225-group-project.climate_dwh.ghgas_dim`
GROUP BY
  ghgas_country
ORDER BY
  total_emissions DESC;
```

| Row | ghgas_country | total_emissions |
|---|---|---|
| 1 | Zimbabwe | 419699886 |
| 2 | Zambia | 418727198 |
| 3 | Yemen | 417754510 |
| 4 | Viet Nam | 416568318 |
| 5 | Venezuela | 415595630 |
| 6 | Vanuatu | 414622942 |
| 7 | Uzbekistan | 413650254 |
| 8 | USA | 412677566 |
| 9 | Uruguay | 411704878 |
| 10 | United Kingdom | 410732190 |
| 11 | United Arab Emirates | 409759502 |

```
-- Query 5: Gas Component Distribution
SELECT
  Gas,
  COUNT(*) AS component_count
FROM
  `data-225-group-project.climate_dwh.ghgas_dim`
GROUP BY
  Gas;
```

| Gas | component_count |
|---|---|
| CH[4] | 121152 |
| CO[2] | 126744 |
| N[2]*O | 121152 |

```
-- Query 6: Years with most emission in USA
CREATE OR REPLACE TABLE `data-225-group-project.climate_dwh.yearwithmostgasemission` AS
SELECT
  Year,
  SUM(ghgas_id) AS total_emissions
FROM
  `data-225-group-project.climate_dwh.ghgas_dim`
WHERE
  ghgas_country = 'USA'  -- Adjust this condition based on your actual data
GROUP BY
  Year
ORDER BY
  total_emissions DESC
LIMIT 10;
```

| Year | total_emissions |
|---|---|
| 2021 | 2175560 |
| 2020 | 2175551 |
| 2019 | 2175542 |
| 2018 | 2175533 |
| 2017 | 2175524 |
| 2016 | 2175515 |
| 2015 | 2175506 |
| 2014 | 2175497 |
| 2013 | 2175488 |
| 2012 | 2175479 |