Yugo and Bentley Hydrocarbon (HC) Emissions

2025-03-04

```
carData <- read_csv("carData.csv")
```

```
## New names:
## Rows: 220 Columns: 9
## -- Column specification
## -------------------------------------------------------- Delimiter: "," chr
## (1): car dbl (8): ...1, day, con, rep, hc, co2, co, dev
## i Use `spec()` to retrieve the full column specification for this data. i
## Specify the column types or set `show_col_types = FALSE` to quiet this message.
## * `` -> `...1`
```

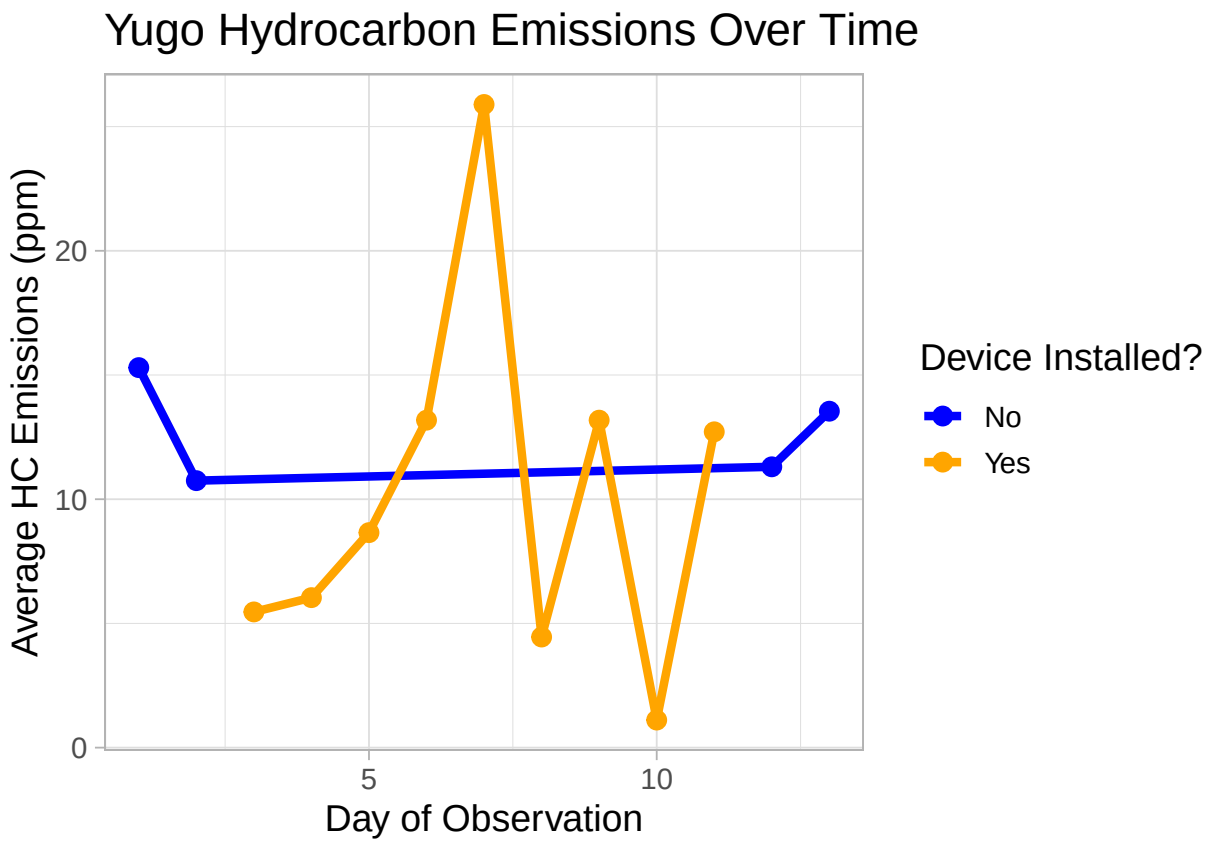
```
Yugo_hc_emissions <- carData |>
  select(day, hc, car, dev) |>
  mutate(dev = ifelse(dev > 0, "Yes", "No")) |> #Ensuring that device is either T or F
  filter(car == "Yugo") |>
  group_by(dev, day) |>
  summarise(avg_emission = mean(hc, na.rm = TRUE))
```

```
## `summarise()` has grouped output by 'dev'. You can override using the `.groups`
## argument.
```

```
Yugo_hc_plot <- ggplot(Yugo_hc_emissions, aes(x = day, y = avg_emission, colour = dev, group = dev)) +
  geom_line(size = 1.5) +
  geom_point(size = 3) +
  scale_color_manual(values = c("Yes" = "orange", "No" = "blue")) +
  labs(
    title = "Yugo Hydrocarbon Emissions Over Time",
    x = "Day of Observation",
    y = "Average HC Emissions (ppm)",
    colour = "Device Installed?"
  ) +
  theme_light(base_size = 14)
```

```
## Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use `linewidth` instead.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

```
Yugo_hc_plot
```




```
Meow <- "Hi"

Bentley_hc_emissions <- carData |>
  select(day, hc, car, dev) |>
  mutate(dev = ifelse(dev > 0, "Yes", "No")) |> #Ensuring that device is either T or F
  filter(car == "Bentley") |>
  group_by(dev, day) |>
  summarise(avg_emission = mean(hc, na.rm = TRUE))
```

```
## `summarise()` has grouped output by 'dev'. You can override using the `.groups`
## argument.
```

```
Yugo_hc_plot <- ggplot(Bentley_hc_emissions, aes(x = day, y = avg_emission, colour = dev, group = dev))
  geom_line(size = 1.5) +
  geom_point(size = 3) +
  scale_color_manual(values = c("Yes" = "orange", "No" = "blue")) +
  labs(
    title = "Bentley Hydrocarbon Emissions Over Time",
    x = "Day of Observation",
    y = "Average HC Emissions (ppm)",
    colour = "Device Installed?"
  ) +
  theme_light(base_size = 14)

Yugo_hc_plot
```

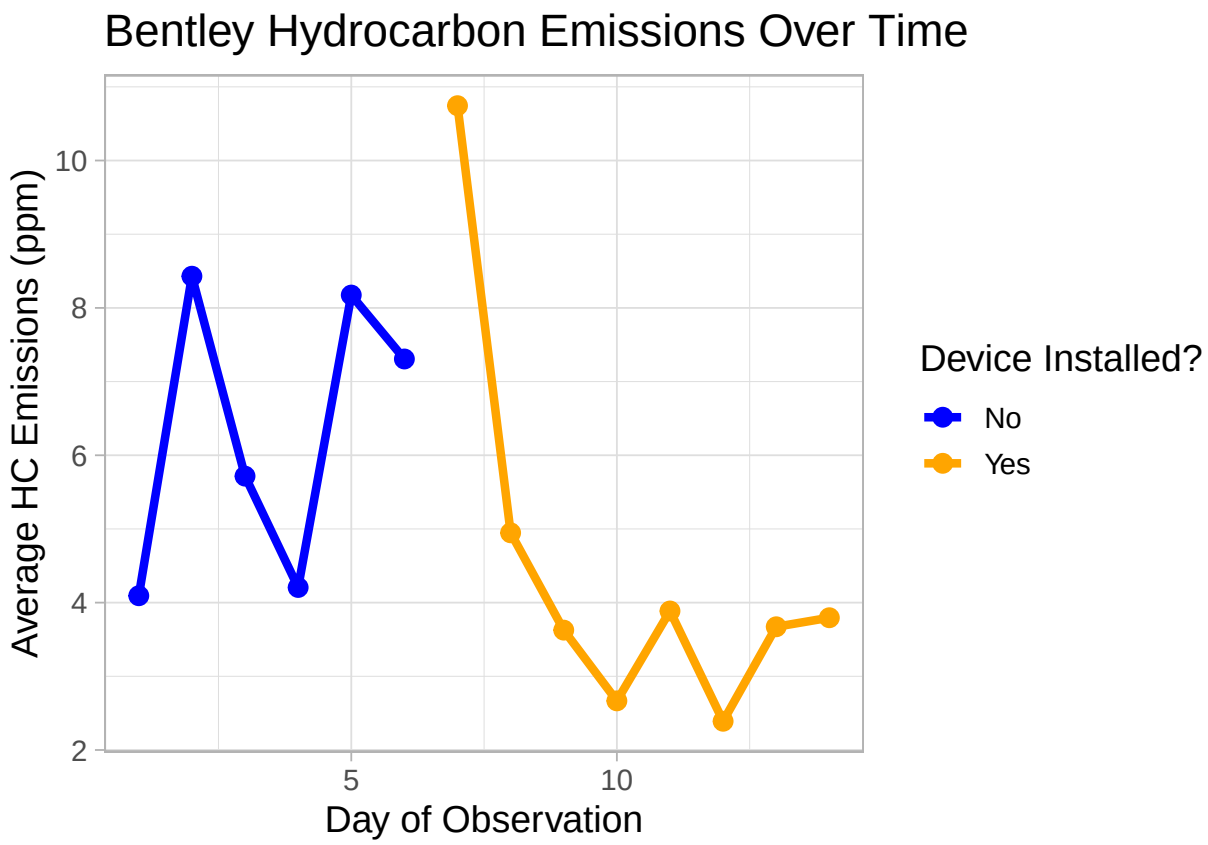

Bentley Hydrocarbon Emissions Over Time
Average HC Emissions (ppm)
10
8
6
4
2
5
10
Day of Observation
Device Installed?
No
Yes

Figure 1: Hi