Methanem Comparison

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```
# Load in trailer Methane
Trailer <- readRDS('TrailerProcessed-20240601.rds')

trailer_ch4 <- Trailer %>% select(time_utc, ch4) %>%
  mutate(day = as.Date(format(as.POSIXct(time_utc), '%Y-%m-%d')))
```

```
# Load in VNF data
vnf <- readRDS('pb-vnf_20230501-20240601.rds')

vnf <- vnf %>%
  mutate(across(where(is.numeric),  ~ na_if(.x, 999999))) %>% # replace 999999 as missing
  filter(!(is.na(temp_bb) | is.na(methane_eq))) # keep those not missing temperature

vnf <- vnf %>%
  filter(temp_bb >= 1600)

loving_lonlat <- c(-104.1089, 32.2961)
distance_km_lov <- function(long, lati){
  start <- c(long, lati)
  distGeo(start, loving_lonlat) / 1000
}

vnf <- vnf %>%
  mutate(distToLovi = mapply(distance_km_lov, lon, lat))

radius <- c(5, 10, 20, 50, 100)

methane_corr <- tibble(radius = radius,
                       n = rep(0, length(radius)),
                       correlation = rep(0, length(radius)))

for (r in radius) {
  temp <- vnf %>%
    filter(distToLovi <= r)

  merged_ch4 <- temp %>%
    select(date, methane_eq) %>%
    group_by(date) %>%
    summarise(avg_methane_eq = mean(methane_eq)) %>%
    left_join(trailer_ch4 %>%
                select(day, ch4) %>%
                group_by(day) %>%
```

```
                summarise(avg_ch4 = mean(ch4, na.rm=T)),
              join_by(date == day)) %>%
  rename('ch4_vnf' =  'avg_methane_eq',
         'ch4_trailer' = 'avg_ch4')

  methane_corr <- methane_corr %>%
    rows_update(tibble(radius = r,
                       n = nrow(merged_ch4),
                       correlation = cor(merged_ch4$ch4_vnf,
                                         merged_ch4$ch4_trailer)), by = 'radius')
}

methane_corr
```

```
## # A tibble: 5 x 3
##   radius     n correlation
##    <dbl> <dbl>       <dbl>
## 1      5    12     0.586
## 2     10    76     0.158
## 3     20   212    -0.0218
## 4     50   343     0.00157
## 5    100   370     0.0699
```