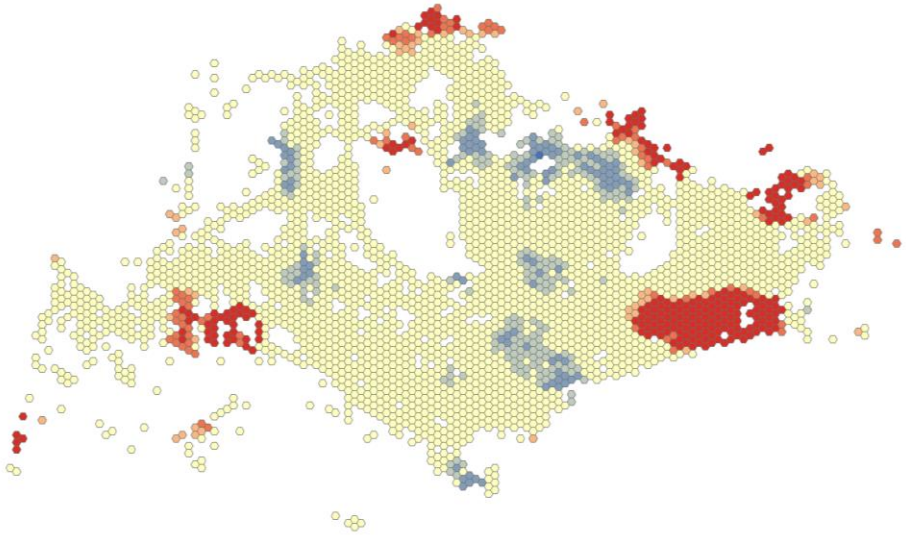
1. **Can you use R to calculate the mean and median speed over all grid cells? Write down both the command you used and the answer.**

   The mean speed over all grid cells is 16.93 unit, and the median speed is 13.95 unit. The commands used are as follows:

   ```
   > mean(s.sp@data$perc_disc_50)
   [1] 16.92992

   > median(s.sp@data$perc_disc_50)
   [1] 13.94566
   ```

2. **Export the resulting map to PNG (File | Export Map). There is no need to worry about titles, legends or a finished cartographic product for now. Include the map in your assignment and also include a short discussion of the results. What are the significant cold and hotspots? If you were working for IDA, what would or could you do with this information?**



   As we can see from the map, although there is a fairly random distribution of speed in most areas, there are still regions of significant cold and hotspots, colored in blue and red respectively.

   The main cold spots are located at north (Yishun-Seletar-Sengkang), near town (Kallang & Serangoon), as well as near Sentosa Island. The main hotspots are located near East Coast (Bedok-Marine Parade-Geylang) and west (Jurong East-Boon Lay).

   With this information, there are several tasks I could do:

   a. Identify reasons for cold or hotspots: as Internet speed is affected by network traffic, distance between stations, as well as physical obstruction, it is important to examine the

cold and hotspot for phenomena or structures that may have affected the speed. This will be useful for future speed improvement.

b. Identify the areas that requires Internet speed upgrade: it may seem natural to focus on increase speed at cold spots. However, in practice we should check the map against population density, and focus on regions with high population and low network speed, as well as regions with high population and moderate speed. Cold spots with low population density come at lower priority.