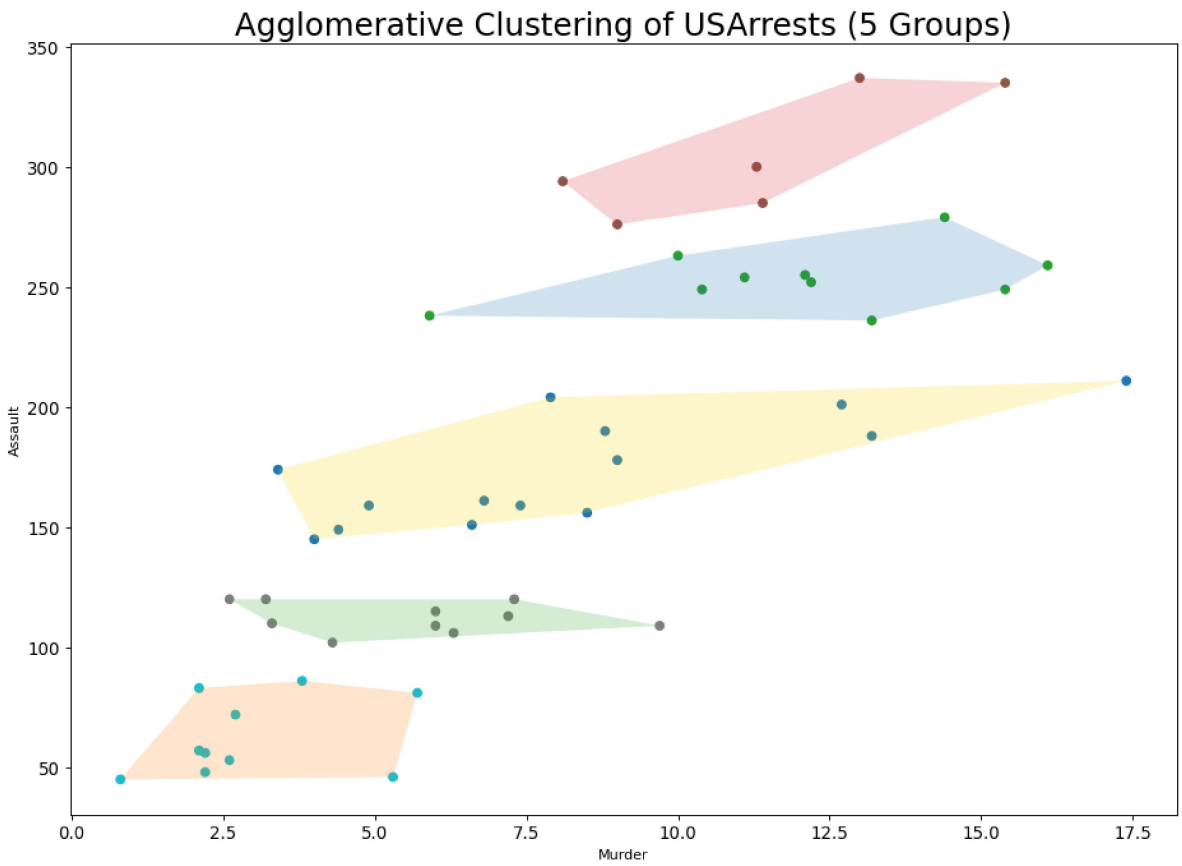
In [14]:
```
from sklearn.cluster import AgglomerativeClustering
from scipy.spatial import ConvexHull

# Import Data
df = pd.read_csv('https://raw.githubusercontent.com/selva86/datasets/master/USArr

# Agglomerative Clustering
cluster = AgglomerativeClustering(n_clusters=5, affinity='euclidean', linkage='wa
cluster.fit_predict(df[['Murder', 'Assault', 'UrbanPop', 'Rape']])

# Plot
plt.figure(figsize=(14, 10), dpi= 80)
plt.scatter(df.iloc[:,0], df.iloc[:,1], c=cluster.labels_, cmap='tab10')

# Encircle
def encircle(x,y, ax=None, **kw):
    if not ax: ax=plt.gca()
    p = np.c_[x,y]
    hull = ConvexHull(p)
    poly = plt.Polygon(p[hull.vertices,:], **kw)
    ax.add_patch(poly)

# Draw polygon surrounding vertices
encircle(df.loc[cluster.labels_ == 0, 'Murder'], df.loc[cluster.labels_ == 0, 'As
encircle(df.loc[cluster.labels_ == 1, 'Murder'], df.loc[cluster.labels_ == 1, 'As
encircle(df.loc[cluster.labels_ == 2, 'Murder'], df.loc[cluster.labels_ == 2, 'As
encircle(df.loc[cluster.labels_ == 3, 'Murder'], df.loc[cluster.labels_ == 3, 'As
encircle(df.loc[cluster.labels_ == 4, 'Murder'], df.loc[cluster.labels_ == 4, 'As

# Decorations
plt.xlabel('Murder'); plt.xticks(fontsize=12)
plt.ylabel('Assault'); plt.yticks(fontsize=12)
plt.title('Agglomerative Clustering of USArrests (5 Groups)', fontsize=22)
plt.show()
```


Agglomerative Clustering of USArrests (5 Groups)
Assault
Murder
350
300
250
200
150
100
50
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5

In [ ]: