Abstract: The study of the Fermi gamma-ray sky has revealed several new diffuse emission components, including the Fermi Bubbles and the Galactic center excess. I will discuss how we analyze the gamma-ray sky using wavelets. Focusing on the inner 60° of the sky, we have identified the Fermi Bubbles, finding that they are clearly diffuse in their nature. Moreover, we have clearly detected the southern cocoon inside the Southern Bubble and also a northern cocoon that is ∼30% dimmer than the southern one. I will also discuss the characterization of the Galactic center excess. At latitudes |b| ≤ 5°, there is indication for power in small angular scales that could be the result of point-source contributions, but for |b| ≥ 5° that emission is dominantly diffuse in its nature. Our results give proof of the smooth transition between the Galactic center excess and the Fermi Bubbles. Furthermore, the Galactic center excess has an aspect ratio of 1.0±0.2-0.3, being more elongated along the disk at 1-5 GeV and elongated perpendicular to the disk for E ≥ 10 GeV. Also, at low latitudes it is off-center by 4° – 6° in negative l with this offset reducing to 1° after masking the Galactic disk. I will finally discuss how these findings affect our understanding of the gamma-ray physics in the Inner Galaxy.