As discussed elsewhere, since the properties of the interior of the Earth act as if they are at the center of the Earth, measuring gravity alone is not a good way of figuring out the internal density profile of a planet. Moving the gravimeters closer to the center allows you to accurately measure the masses and densities of the layer down to 1 km (since that material goes from interior to exterior, but that's not particularly useful and is already known (see the last column in the PREM reference).

In this sense, the gravimeters provide no information on the 2885 density discontinuity. In practice, two major methods are used to measure these properties: seismology and higher-order gravitational harmonics. I imagine you're familiar with seismology, so will focus on the latter.

Since the Earth is not actually a perfect sphere, its gravitational field is not perfectly represented by a point mass at the center (although it is the dominant effect). One can take the remainder of the gravitational field and look at its major components by using an advanced mathematical technique called spherical harmonics (like a Fourier transform, but on a sphere). The math is not important: what is important is that we can measure the precise variations of the gravity field with very high accuracy and these give information on the interior of the planet. In terms of accuracy, the GRACE mission measured gravity so well, that it could detect the nanoscopic changes in Earth's gravitational field due to earthquakes, for example. GRAIL is doing similar work at the Moon and JUNO is on its way to Jupiter with similar goals.

How does this give information on the insides of planets? Well, imagine two planets: one homogenous (uniform density throughout) and one very concentrated in mass at the center, with a light fluffy atmosphere. You can make two such planets with the same mass and density. The regular spherical gravitational field for these will be identical. But, if you spin these planets, then the homogeneous planet bulges out a little bit, but the fluffy atmosphere on the concentrated planet spreads out a lot, since it's light and easy to move around. These two planets will then have different gravitational fields and this general idea can be used to determine the interior properties of planets. Ragozzine & Wolf 2009 applied this principle to exoplanets.

So, why use satellites like GRACE instead of gravimeters inside mines? Well, it's harder to figure out exactly what's going on in this case since nearby materials and local conditions can have a disproportionate affect. These satellites are not surrounded by material, sample the whole globe, and have succeeded in very precise gravitational measurements.

(Response from dragozzine).