

It's often taught that changes in focal length cause the depth in your scene to be compressed. While it's true that a longer focal length will make background elements in a scene appear closer, the term "depth compression" can be misleading because it implies distortion. If depth is being compressed, then the implication is that the axis that is perpendicular to the camera is being altered more than the axis that runs parallel to the film plane.

The idea of depth compression is further reinforced visually by the fact that some elements in your scene will appear very different as you change focal lengths. However, these changes in appearance are almost always related to changes in *camera position* rather than any kind of optical distortion.

For example, consider the rather boring shots shown in Figure 1. The first image was shot with a focal length of 24mm, while the second image was shot at 105mm. In both images, the goal was to keep the chimney framed the same way. So, in the first image I stood very close to the chimney, because I was shooting extremely wide-angle, and in the second image I stood farther back because of the more telephoto focal length that I was using.

In the second image, the buildings in the background are much larger, and appear closer, and it is this phenomenon that leads people to refer to changes in focal length as "depth compression."

Meanwhile, the chimney looks very different in the two images. However, this change in the chimney's appearance is the result of the change in camera position, *not* the change in focal length. Because the goal was to keep the shots framed the same way, I had to get very close to the chimney when shooting with a shorter focal length, and this change in vantage point left me looking up at the top of the chimney.

The point here is to recognize that, although the sense of space and distance of the background appears different in the two images, there's no actual distortion going on. The easiest way to illustrate this is to zoom in on some background details.



Figure 1. *The upper image was shot from fairly close, using a 24mm lens. For the second image, I moved farther back and changed to a more telephoto, 105mm focal length..*

In Figure 2, I've isolated the same background detail in both images – the Marriot hotel in downtown San Francisco. The upper image is a blow-up from the 24mm frame, while the lower image is the same area enlarged to the same size from the 105mm frame. Obviously, the wide-angle image required more enlargement, as the hotel was much smaller in the background, so there's a difference in detail and sharpness. However, these changes don't obscure the overall shape.

When viewed up close, you can see that both images appear almost identical. If there was really some kind of optical “compression” going on, then the first image would be stretched along one axis, resulting in a building that appeared very distorted and skewed. Instead, the two shots are identical, revealing that no distortion is created by our change in focal length.

The good news is that none of this changes the way you shoot. If you want background elements in your image to appear larger and more prominent, then you'll want to use a longer focal length.

Any changes in appearance in the elements in your scene – such as the chimney – are entirely the result of a change in camera position and associated focal length. They are not the result of any kind of distortion or optical compression.

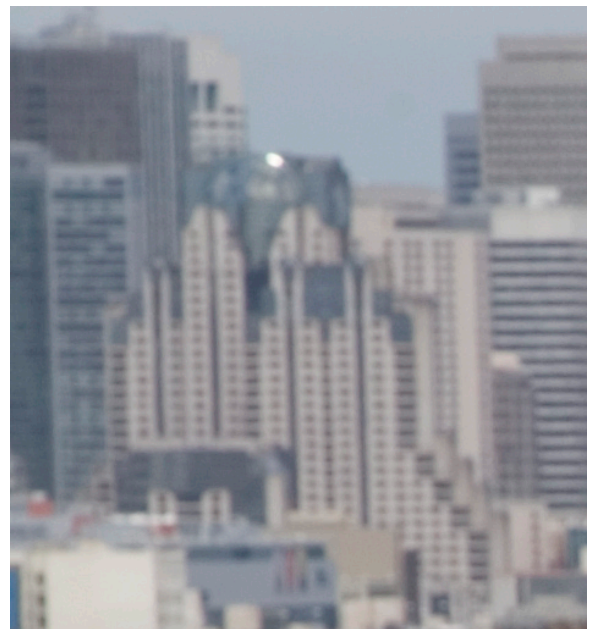
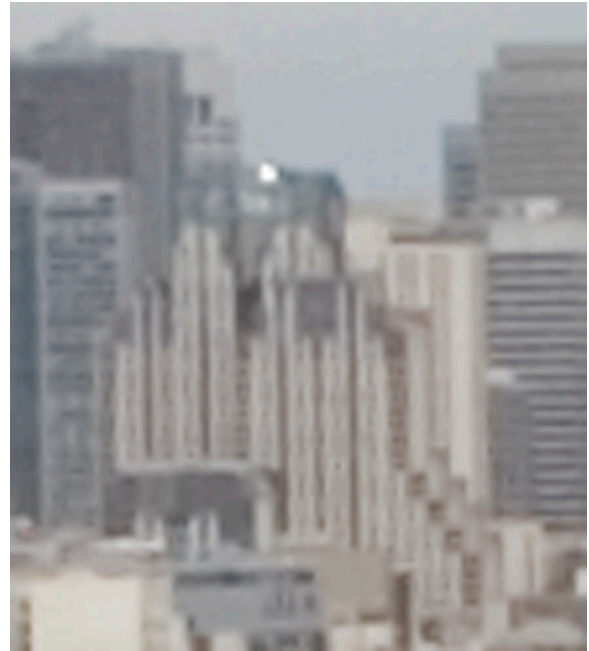


Figure 2. Here, we've cropped and enlarged the same background detail from both images. The upper frame shows the 24mm crop, while the lower frame shows the 105mm crop.