Making the decompression faster is our priority, however, keeping in mind the precision loss and the file size in mind is also crucial. So in the end, it depends on the situation and on our priorities but generally speaking, finding a balance between them is key. Therefore in this particular case, with the available data we have, and following the results of each compression, I would go for the 8 bits compression, for two reasons.

First, it's faster to compress and decompress a byte. Second of all, I noticed that the file size grows proportionally with the number of bits used in the compression, however, the RMS error does not. It drops really fast each time we add a compression bit (divided by two each time).

I would also consider the 16 bits conversion if limiting the loss of precision is a high priority, and I chose above the others like 15 or 14 for the same reason as 8; faster compression and decompression since we would use short directly.

So in the end, I think the 8 bits compression is the optimal choice in this case.