On some regularity results for elliptic boundary value problems

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About thirty years ago, in reference "On the solutions in the large of the two-dimensional flow of a nonviscous incompressible fluid", J. Diff. Eq., vol.54, 1984, we looked for "minimal assumptions" on the data which guarantee that solutions to the two dimensional evolution Euler equations in a bounded domain are classical. Classical means here that all the derivatives appearing in the equations and boundary conditions are continuous up to the boundary. Following a well known device, the above problem led to consider this same regularity problem for the Poisson equation under homogeneous Dirichlet boundary conditions. At this point, one was naturally led to consider the extension of this last problem to more general linear elliptic boundary value problems, and also to try to extend the results to more general data spaces. This leads to new problems and functional spaces. We want to describe the route followed by us in studying this kind of problems.