# The spatialLrf package for S-PLUS

Instructions for Installation and Use

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## Overview

The spatialLrf package fits the spatial moving-average model described in Woodard, Wolpert, and O'Connell (2009). The authors welcome any contributions or suggestions. The package has been tested only on RedHat Linux, although the authors are not aware of any reason why it should not work on other platforms, including Windows. We are also not aware of any reason why the package should not work in R as well as S-PLUS, although there may be some very small syntax changes to be made.

spatialLrf includes much of the source code of the Template Numerical Toolkit, developed by the National Institute of Standards and Technology. The data that is included in the package is processed from the publically available data published in the U.S. Geological Survey Open-File Report 98-158 as described below.

## System Requirements

Requires S-PLUS 8.0.1+.

## Instructions for Installation and Use (Linux)

1. Download the source code for the package (spatialLrf_0.0.tar.bz2) and unzip in a local directory using the command "tar –xvf ./spatialLrf_0.0.tar.bz2"
2. Edit the file installPackage in the base directory, by replacing "~/rlibs" with the directory where you would like to install the package.
3. Change directory using the "cd" command so that you are in the directory where you unzipped the files. Run the executable file installPackage by calling "./installPackage". The first time you run it you will get a warning "cannot remove <lib_directory_name>: no such file or directory;" ignore this warning. After the warning it should say "Installing *source* package 'spatialLrf'", and give a list of "make", "g++", and "LIBRARY" statements. Then it should output some notes on the progress of the package build.
4. Open S-PLUS and call library( spatialLrf, lib.loc=<your_lib_dir> ), where <your_lib_dir> is the directory where the spatialLrf package is installed.
5. Instructions for using the package and code for fitting the model to the data in the paper are given in the help file for the lrfRun function. Call help( lrfRun ) after loading the package. This help file can also be opened manually; it is located in the "man" subdirectory of the package source code.

## Instructions for Testing the Package

The spatialLrf package includes a number of test scripts that validate the output of the model-fitting function. They can be run by changing into the same directory where the source files were unzipped, and calling "./checkPackage". You will need to have write permissions to the current directory. Before calling checkPackage, you will need to edit the file spatialLrf/tests/noDataMdistn.t and noDataPreDistn.t; change the directory for coda.loc to the directory where you have installed the coda package.

A warning about line endings is generated but should be ignored. After each test file is run you will get a 2-line printout giving the name of the test file and a short description of the test. If the test file passes there will be no further printout; if it fails then the code of the test file will print out. All of the tests should pass. At the end you will get a line saying "ERROR", with no description of the error; this is a bug with S-PLUS and does not indicate that any of the tests failed. Again, as long as you only get a two-line printout for each test then the test has passed.

## Data

The data that is included in the package (object gwNit) is from the publically available data published in the U.S. Geological Survey Open-File Report 98-158; more information regarding this data is available in that report. We have restricted to the set of total nitrate measurements from that report. The Lon and Lat variables in gwNit are the longitude and latitude of the locations; the x and y variables are the approximate easting/northing coordinates in kilometers relative to the center point of the region as described in Woodard, Wolpert, and O'Connell (2009), Section 5.1. The z variable is the total nitrate measurement.

## Known Bug

Occasionally, just after building the package, running the code in the help file for lrfRun results in the S-PLUS system hanging during the call to the lrfRun function. If this happens, close S-PLUS and rebuild the package. You should not get this problem again once the package builds correctly.

## Troubleshooting

If all S-PLUS licenses are currently in use then the package may not build or check correctly. Exit one of your S-PLUS sessions so that a license is available.