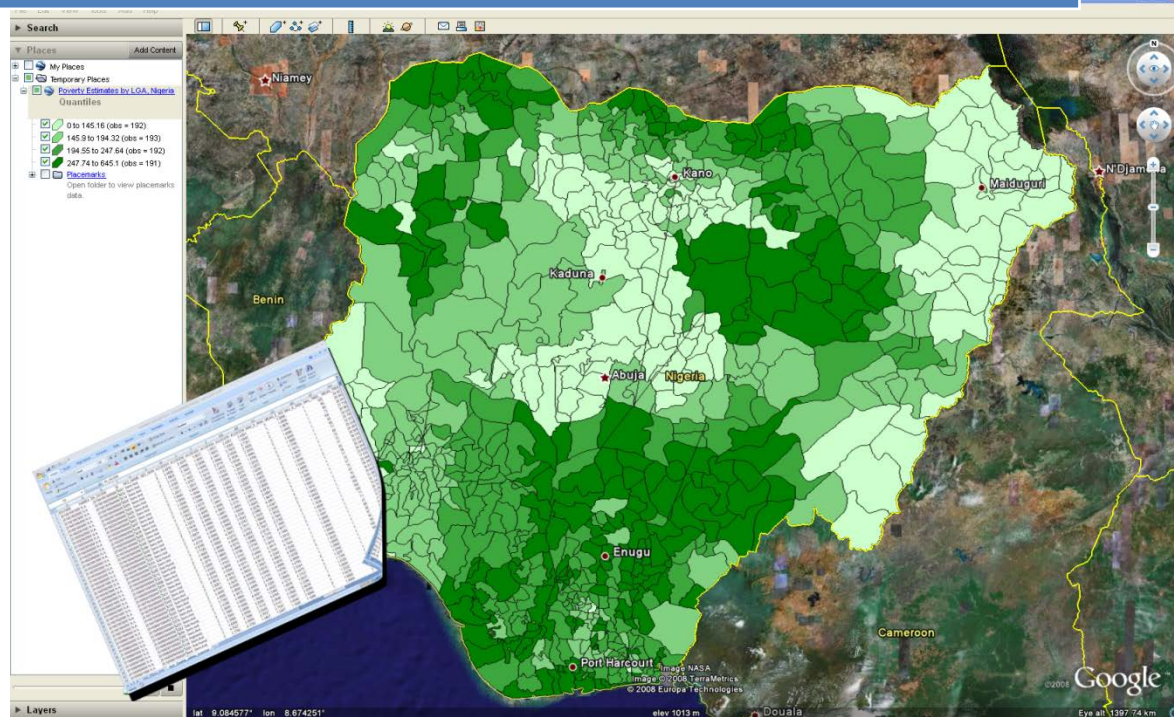


MEASURE Evaluation Excel to Google Earth (E2G) 3.0 Tutorial



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MEASURE Evaluation

University of North Carolina at Chapel Hill

<http://www.cpc.unc.edu/measure>

This document contains the tutorial for the MEASURE Evaluation Excel to Google Earth (E2G) mapping tool, version 3.0, revised March 2014.

The tool is released as a public beta.

For the most recent version of the tool visit the MEASURE Evaluation Web site at <http://www.cpc.unc.edu/measure/e2g>

To provide feedback or request information about the tool, contact MEASURE Evaluation at e2ghelp@unc.edu

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EXCEL TO GOOGLE EARTH (E2G) 3.0 TUTORIAL

SYSTEM REQUIREMENTS

The use of this tool requires:

- 1) Windows 7, Vista, or XP. (The tool will not work in Windows 8 or on other platforms such as Linux or Macintosh.)
- 2) Excel 2010 or 2007. (Macros such as this one, written in Visual Basic, will no longer work in Excel 2013.)
- 3) Google Earth version 7 or version 6. (The tool has not been tested with other versions of Google Earth.)

Google Earth is a free virtual earth viewer available for download here:

<http://www.google.com/earth/>

Please see your system administrator for help installing Excel and Google Earth before proceeding with the installation of the E2G tool.

INSTALLING THE MAPPING TOOL ON YOUR COMPUTER

The E2G tool is available free from MEASURE Evaluation and can help class and display geographic data from any Excel spreadsheet as an overlay in Google Earth. It requires that the data to be mapped be available at the sub-country level, by administrative unit (state, province, district, etc.). We provide basic sub-country administrative boundaries for 50 different countries on our website; other boundaries can be added by the user (using a shapefile, a common type of GIS coordinate file). The tool works in English or French.

The tool and associated country boundary files are available from the MEASURE Evaluation website:

<https://www.cpc.unc.edu/measure/tools/monitoring-evaluation-systems/e2g>

IMPORTANT:

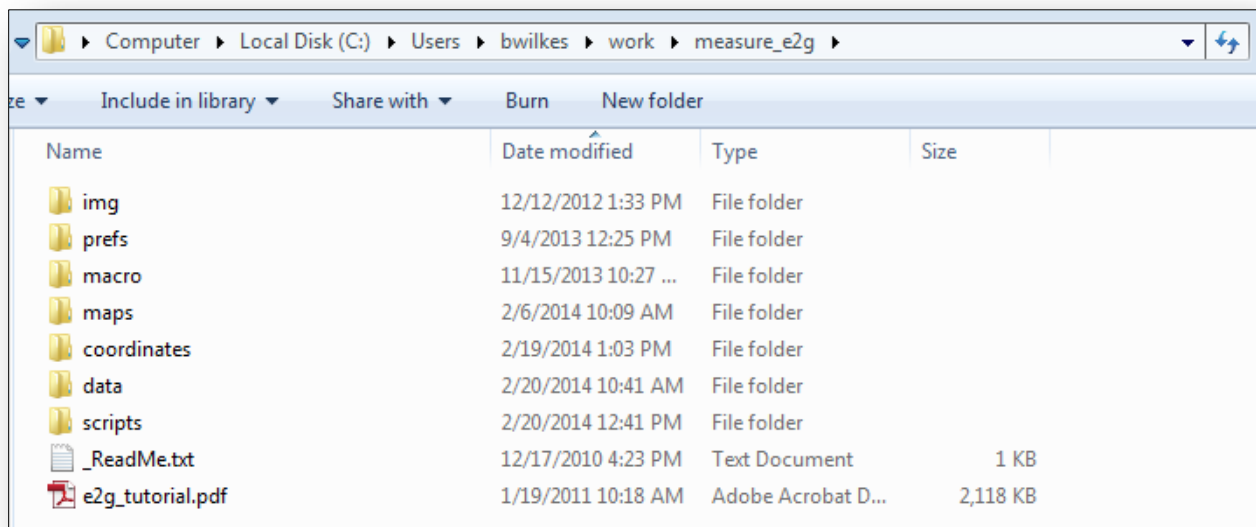
- The installation program for E2G 3.0 (a self-extracting zip file) will **overwrite** files from any previous version. So as a precaution any existing *measure_e2g* directory should be renamed (e.g. "*measure_e2g_previous_version*") or backed up (saved) to a different location on the hard drive, prior to installing the new version. (Once the new version is installed, you may copy any previous "*data*" (input) and "*maps*" (output) files into the new "*data*" and "*maps*" directories, for continued access, if you wish).
- If any shortcuts exist on your desktop from older versions, you may delete these, as upon first use, the new version will create its own new shortcut.
- Installing E2G 3.0 directly to the desktop is not advised, as it could lead to inconsistent performance. Extract the main installation into a folder in your main local directory, and a shortcut will be created on the desktop the first time you use the tool.
- E2G 3.0 has been designed for use by one person at a time working on a desktop or portable computer. Installing the program on a network drive for simultaneous access by multiple users should be avoided, as it could result in file access conflicts.
- The installation path should not contain any spaces.
- Installation will require use of the default **zip utility** that came with your copy of Windows.

Installing the tool is a 2-step process:

- 1) To install E2G 3.0, first run the self-extracting zip file **measure_e2g.exe** (by double-clicking it) and place the resulting macro folder on a local drive
- 2) To install the coordinates for the country you wish to map, run the self-extracting zip file with the 3-letter ISO abbreviation for the country name, and place the resulting folder (or folders, if you have chosen several countries) into the folder called:

YourInstallDirectory\measure_e2g\coordinates

When you have completed your installation, your “*measure_e2g*” folder contents should look something like this:



Double-click on the “*data*” folder. Inside it you will see a list of folders for all the countries for which boundaries are available from MEASURE Evaluation for use with the tool. Each country folder contains one or more sample spreadsheets with dummy data. These sample spreadsheets can be used to enter other data, to practice using the tool, or as templates for your own data files.

Double-click on the “*coordinates*” folder. You should see one or more folders containing administrative boundary coordinates for the countries you have chosen to map. (refer to Step 2 above—this is an important part of the tool installation)

All folders contain “*readme*” files with additional information.

The main tool is in the form of an empty Excel spreadsheet and resides in the “*macro*” folder. To use it for the first time, you must tell Excel to “Enable Macros” for use.

ENABLING THE VBA MACRO

If you have only one version of Excel installed on your computer, simply open the file **YourInstallDirectory\measure_e2g\macro\measure_e2g.xls**.

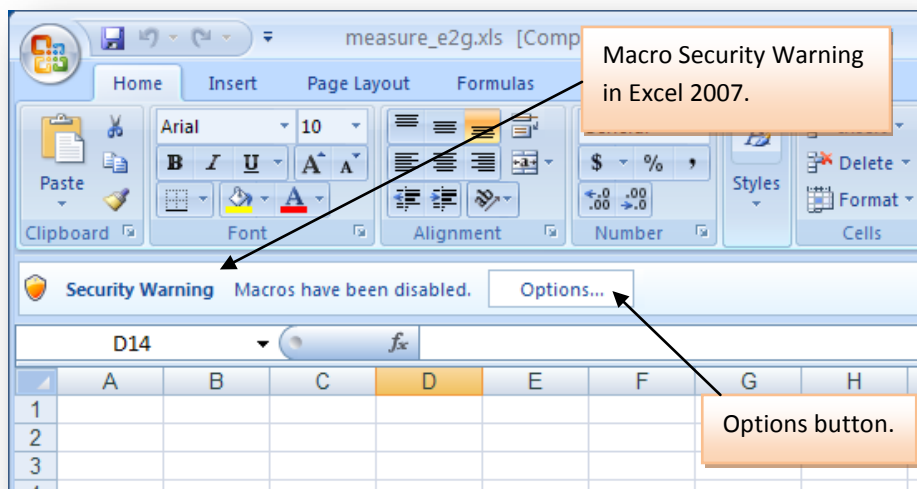
If you have more than one version of Excel installed on your computer, start the version you will be using to access the E2G tool and either (a) open the file **YourInstallDirectory\measure_e2g\macro\measure_e2g.xls** from within Excel or (b) locate the file on your hard drive and double-click on it. Note: For choice b, make sure the version of Excel you would like to use is already running before double-clicking.

The first time you launch the tool, it will create a desktop shortcut to **measure_e2g.xls**.

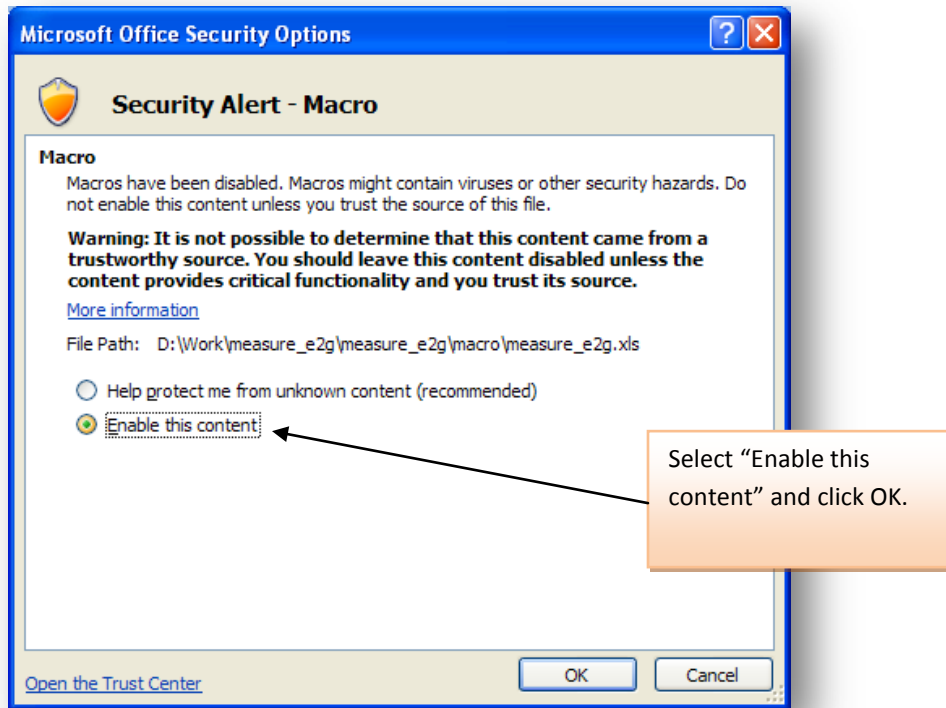
Macro security settings will differ according to the version of Excel you are running. If your security settings already allow you to see the tool (it will be located in the “Add-ins” ribbon—see p. 4 for illustration), you may not need to do anything special to enable it. However, if you receive a security warning when you try to open the tool, please see the following section for details about how to enable the macro in each of the two versions supported by the tool (Excel 2007 and Excel 2010).

Macro Security in Excel 2007:

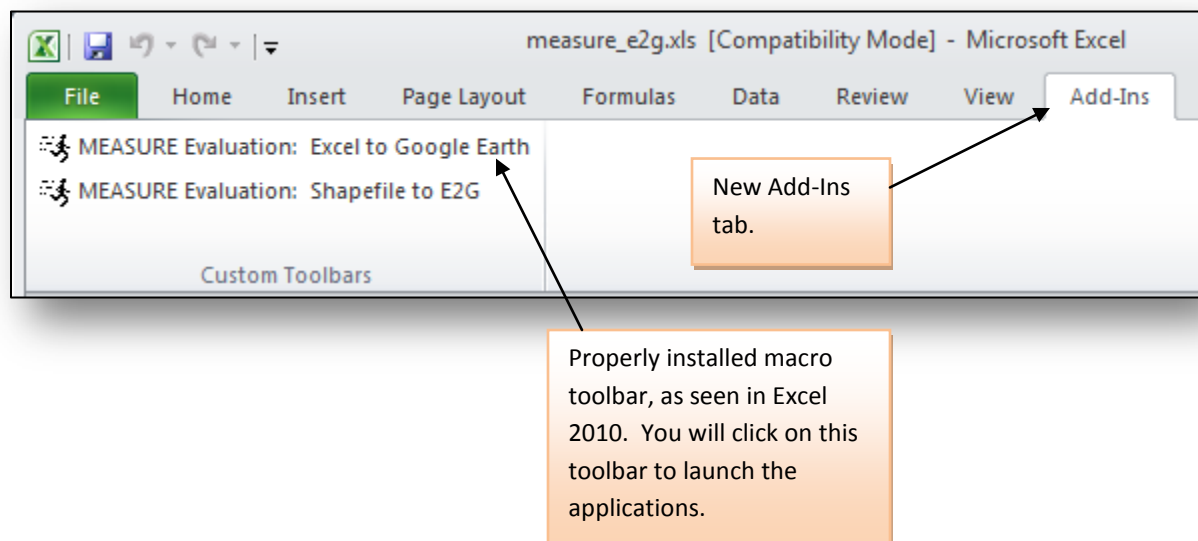
In Excel 2007 and 2010, the “Trust Center” determines macro security. As the default setting is “Disable all macros with notification,” launching the macro may result in a “Security Warning” as shown in the following graphic.



If you get this warning, you will need to click on the Options button. After clicking on the Options button, you will see the following screen:



After clicking OK, you'll see a new tab named **Add-Ins** at the very top navigation level. Select this new tab to gain access to the custom toolbar named **MEASURE Evaluation: Excel to Google Earth**.

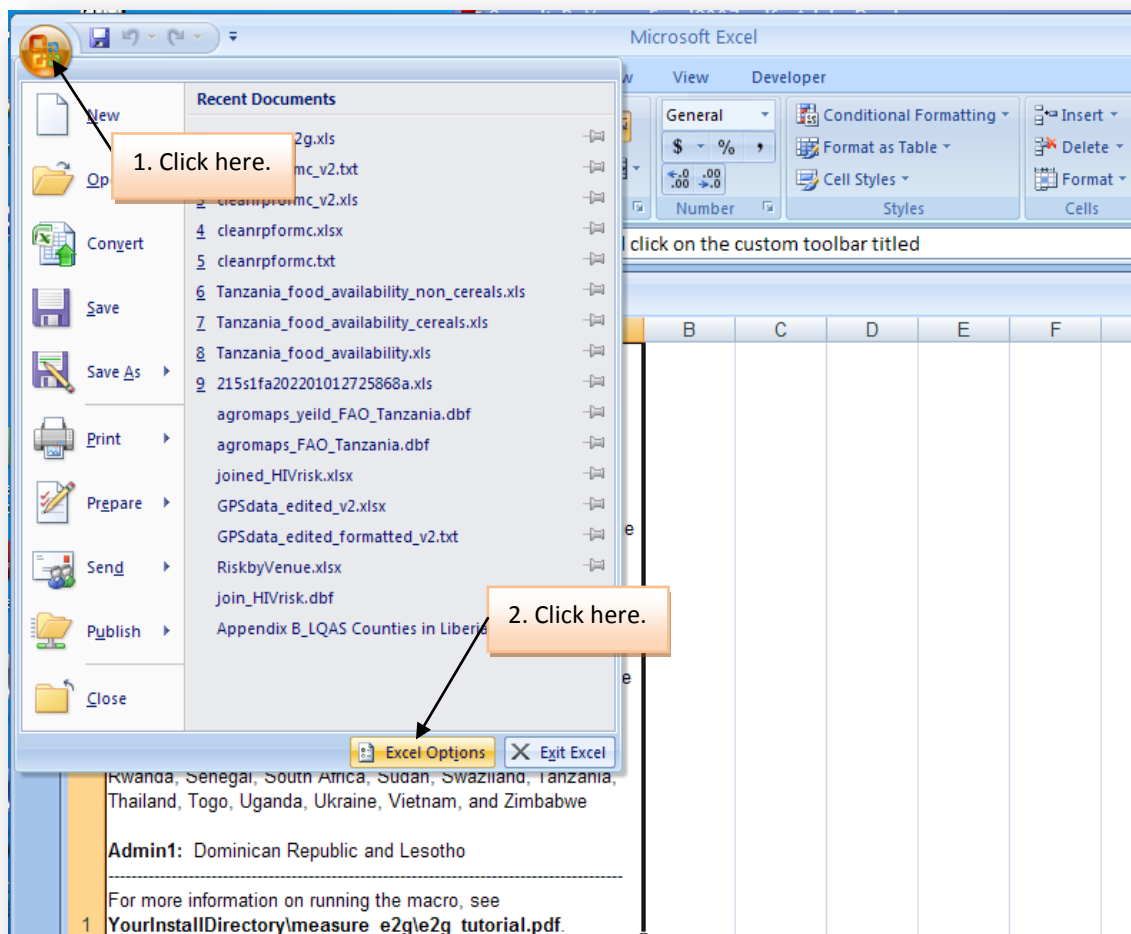


If you opened **measure_e2g.xls** and did NOT see the macro security warning, and also did not see the Add-Ins tab containing the custom toolbar that launches the macro, macros are “disabled without notification”. This means you will need to change some of the “Trust Center” settings.

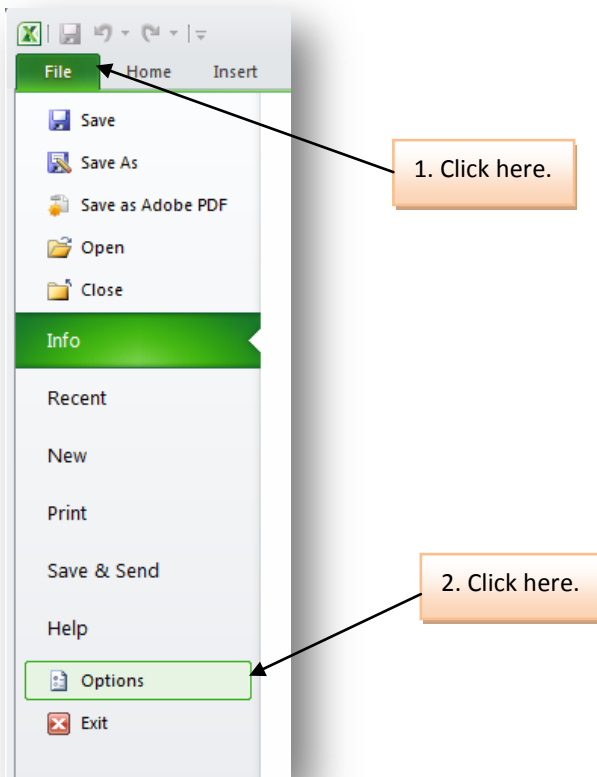
If macros have been **disabled with notifications turned off**, you will NOT receive a Security Warning that allows you to activate the macro. As a result, you will not be able to run the E2G tool. To remedy this, you will need to access the “Trust Center” and change security settings using the following steps (the first step will vary slightly between the 2007 and 2010 versions of Excel; there are pictures of both shown here.)

Step 1: Open Excel Options.

In Excel 2007, this is located here:

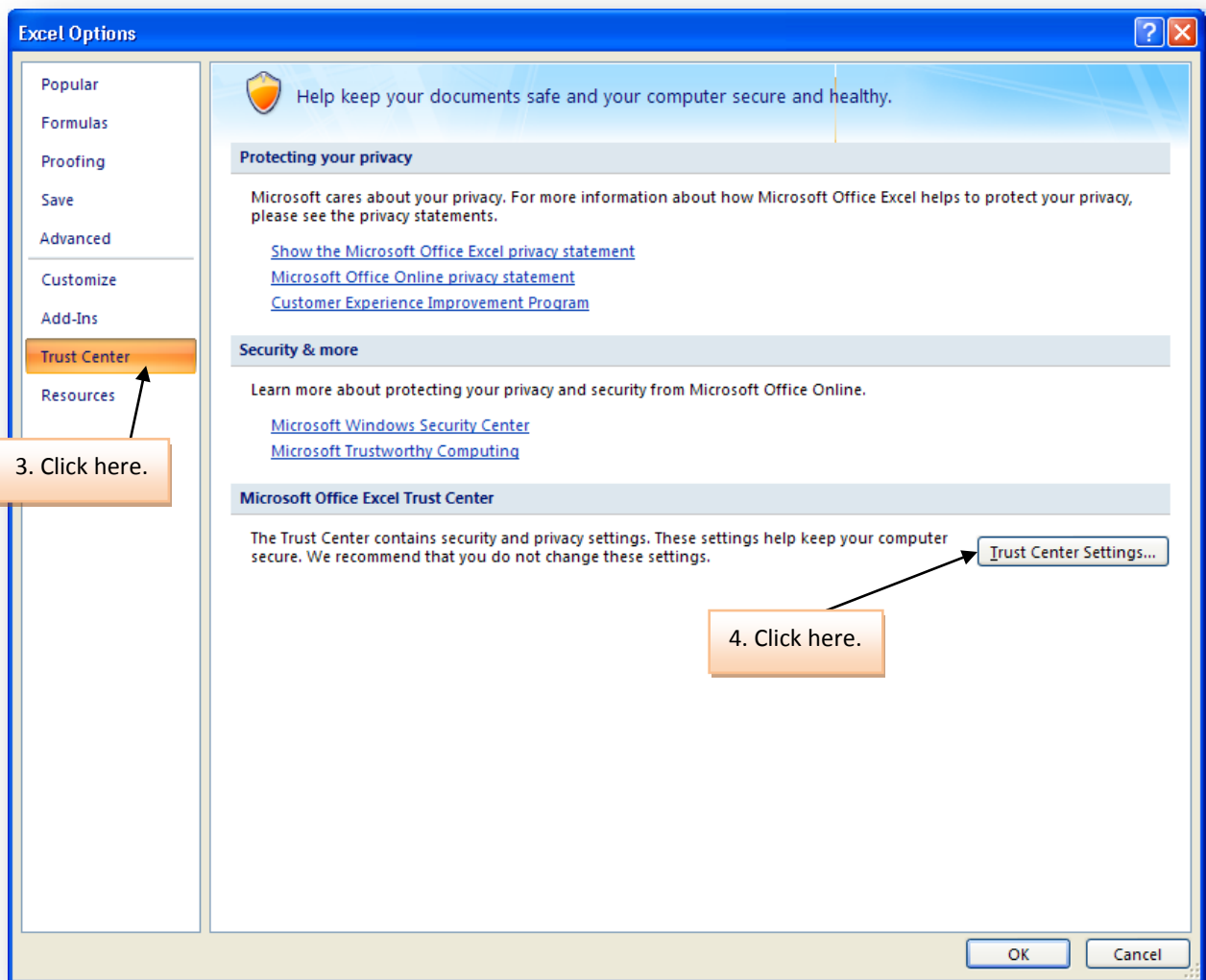


In Excel 2010, you will need to click on the File ribbon and choose “Options”:



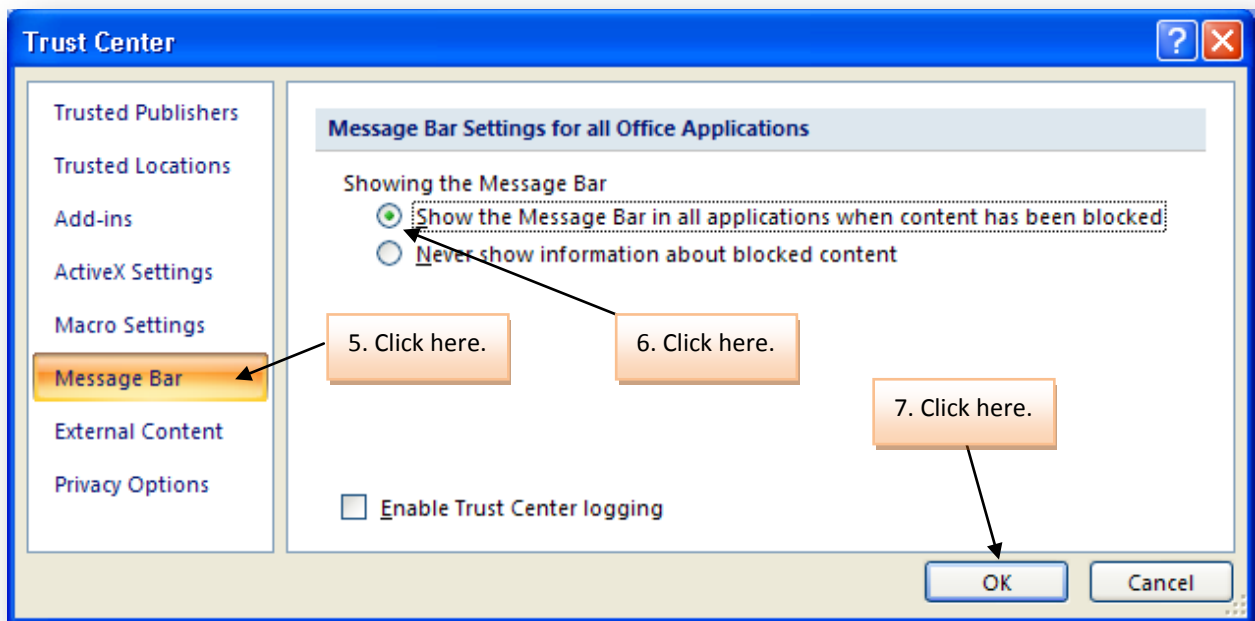
Step 2: Open the Trust Center

In both versions of Excel, the **Excel Options** page contains a link to the **Trust Center** in the left-hand column. Click on this link to bring up a screen that contains the **Trust Center Settings** button (see below—window appearance will vary slightly but is quite similar in the 2007 and 2010 versions of Excel).

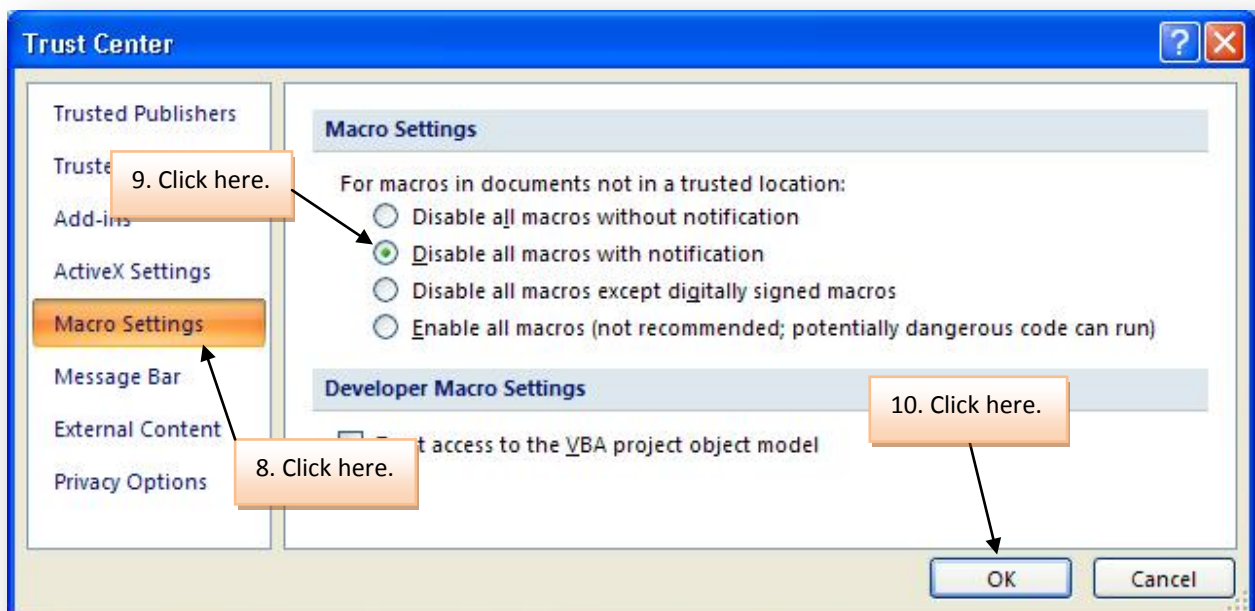


Step 3: Show the Message Bar

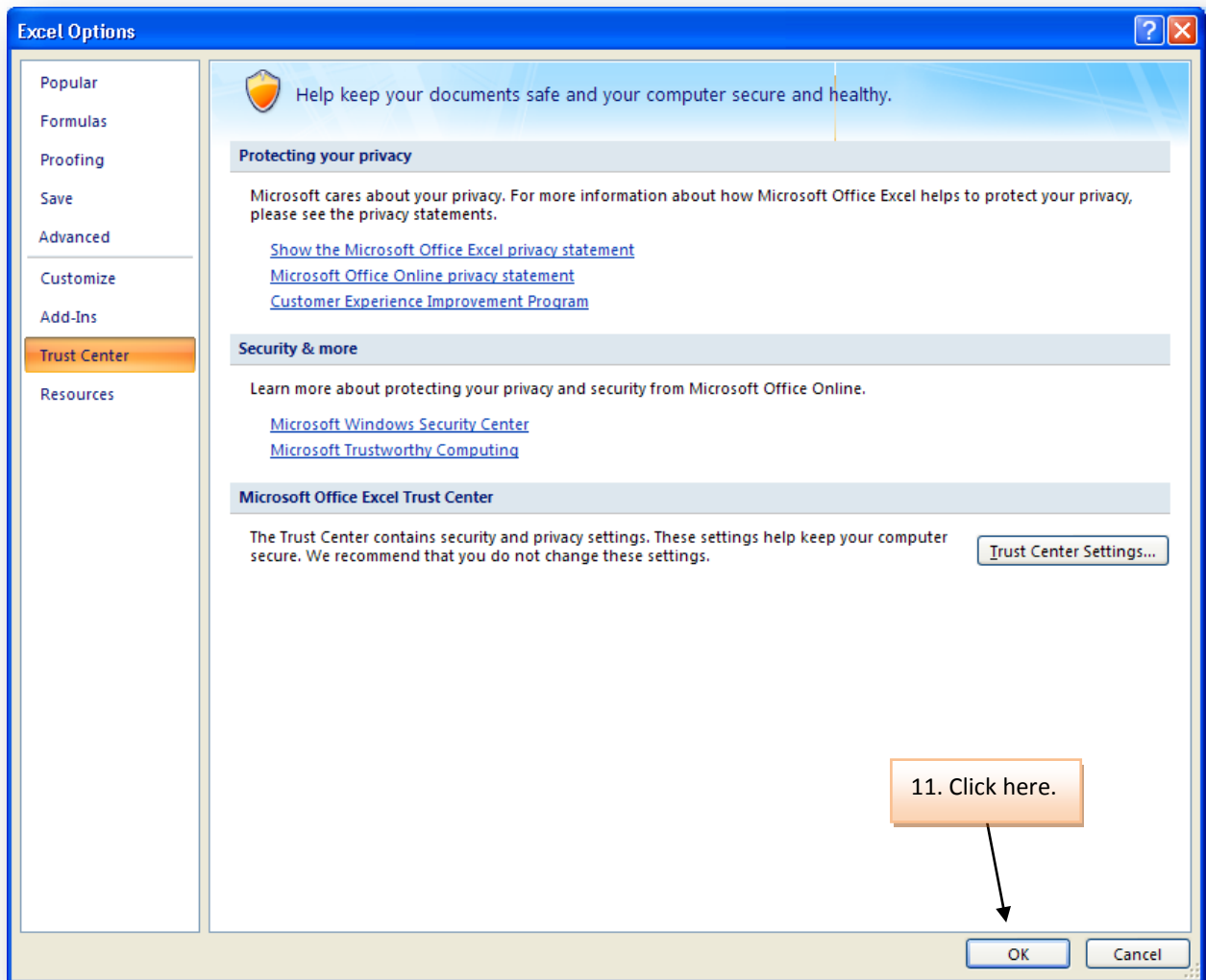
After clicking the **Trust Center Settings** button, you will need to select the **Message Bar** link in the left-hand navigation pane, click on the radio button that enables display of the message bar, and click OK to accept your changes (see below).



Step 4: Change Macro Settings



Step 5: Close the Trust Center



Your settings are complete! Now, in order to see the macro security warning shown on page 3, which will allow you to activate the E2G macro, you will need to close and re-open the file **YourInstallDirectory\measure_e2g\macro\measure_e2g.xls**.

Then choose “enable this macro” and you should see the “Add-Ins” Ribbon appear, as shown on p. 4.

Next, you’ll need to make sure your own data is properly prepared to map.

PREPARING YOUR SPREADSHEET DATA

To produce a map, you must have your data arranged by administrative subdivision in an Excel Workbook, and one of the columns of data **must** contain a list of either the administrative division names for which you would like to create the map (e.g., provinces, districts, states) or a list of codes for these divisions.*The list of administrative division names (or codes) in your spreadsheet **must EXACTLY match** the list of administrative division names (or codes) in the corresponding geographic coordinates file provided with the mapping tool.

In order to assist you with preparing your own data for mapping, we have included a **sample data file** for each country. This file will show you a list of the geographic identifiers in each coordinates file. To verify the list of administrative division names provided for your country, see the sample Excel data files provided with your installation:

YourInstallDirectory\measure_e2g\data\YourCountryAbbreviation_ADMIN1_REGION.xls

The country abbreviations, which are three characters based on ISO 3166, are as follows:

AFG:	Afghanistan	LSO:	Lesotho
AGO:	Angola	MDG:	Madagascar
BDI:	Burundi	MLI:	Mali
BEN:	Benin	MOZ:	Mozambique
BFA:	Burkina Faso	MWI:	Malawi
BGD:	Bangladesh	NAM:	Namibia
BWA:	Botswana	NGA:	Nigeria
CAF:	Central African Republic	NPL:	Nepal
CHN:	China	PAK:	Pakistan
CIV:	Côte d'Ivoire	RUS:	Russia
CMR:	Cameroon	RWA:	Rwanda
COD:	Democratic Republic of the Congo	SDN:	Sudan
DOM:	Dominican Republic	SEN:	Senegal
ETH:	Ethiopia	SSD:	South Sudan
GHA:	Ghana	SWZ:	Swaziland
GUY:	Guyana	TCD:	Chad
GNB:	Guinea-Bissau	TGO:	Togo
GTM:	Guatemala	THA:	Thailand
GUY:	Guyana	TZA:	Tanzania
HTI:	Haiti	UGA:	Uganda
IDN:	Indonesia	UKR:	Ukraine
IND:	India	VNM:	Vietnam
IRQ:	Iraq	ZAF:	South Africa
KEN:	Kenya	ZMB:	Zambia
KHM:	Cambodia	ZWE:	Zimbabwe

We recommend you go to your country's folder inside the "data" folder and take a look at the sample spreadsheet provided. You can use this spreadsheet as a template for entering your own data, if you wish.

E2G Coordinates Files

The coordinates files used by the E2G tool are located in the “coordinates” folder. Within each country’s folder (designated, as in the “data” folder, by 3-letter ISO abbreviation), the necessary files are organized in pairs by administrative level: there is one file for the coordinates needed to map the administrative divisions in Google Earth and a second file for the coordinates needed to map the label points for these divisions. The coordinates files should **not** be edited.

Additional coordinates files are available for download from the same page as the tool itself (see the complete tool installation directions at the start of this document, for more information.)

IMPORTANT: There must be a one-to-one match—including count, order, capitalization, and spelling—between the administrative division names in your spreadsheet and the administrative division names in the E2G “coordinates” files (as shown in the sample “data” files); otherwise, the mapping tool will produce an error message.

If your spreadsheet is missing the name of an administrative division contained in the coordinates file, you will need to add it to your spreadsheet to obtain a full match. **This applies even if there are no data for that administrative unit.** If there are no data for an administrative division, the name field (and alternate code field) should be populated, but the data fields should be **left blank**. Conversely, if your spreadsheet contains the name of an administrative division that is not contained in the corresponding coordinates files, you will need to use a version of your spreadsheet **that does not contain that name**.

*NOTE: It is recommended that you back up your original data before using it with the E2G tool. Always work on a **copy** of your original. That way, if you make a mistake in editing your spreadsheet for use with the tool, you will not lose (or accidentally permanently modify) any original data.

As an example, if you wanted to map province-level data for a country with 23 provinces, your original spreadsheet might look something like the following:

	A	B	C	D	E	F
1	State	Province	Population	Number of Orphans		
2	Plateau	Red	560,000	9,871		
3		Blue	450,000	8,942		
4		Green	640,000	3,697		
5	East Central	Orange	434,000	2,375		
6		Yellow	342,000	3,610		
7		Purple	344,000			
8	W Central	Turquoise	234,000			
9		Chartreuse	212,000			
10	Riverside	White	675,000			
11		Black	665,000			
12		Brown	546,000			
13		Violet	734,000			
14		Pink	692,000	1,525		
15	Highlands	Magenta	79,000	403		
16		Cyan	76,000	832		
17		Coral	84,000	554		
18		Lemon	66,000	493		
19	Southern	Azure	233,000	5,983		
20		Malachite	441,000	6,332		
21		Rose	298,000	5,182		
22	Northern	Stone	23,000	456		
23		Khaki	31,000	531		
24		Olive	49,000	688		
25						
26						

Administrative unit to be mapped is "Province", in column B.

If there were no data for provinces Red, Blue, and Green, the spreadsheet should look like the following:

	A	B	C	D	E	F
1	State	Province	Population	Number of Orphans		
2	Plateau	Red				
3		Blue				
4		Green				
5	East Central	Orange	434,000	2,375		
6		Yellow	342,000	3,610		
7		Purple	344,000	2,493		
8	W Central	Turquoise	234,000	1,973		
9		Chartreuse	212,000	1,485		
10	Riverside	White	675,000	1,276		
11		Black	665,000	1,782		
12		Brown	546,000	1,369		
13		Violet	734,000	1,288		
14		Pink	692,000	1,525		
15	Highlands	Magenta	79,000	403		
16		Cyan	76,000	832		
17		Coral	84,000	554		
18		Lemon	66,000	493		
19	Southern	Azure	233,000	5,983		
20		Malachite	441,000	6,332		
21		Rose	298,000	5,182		
22	Northern	Stone	23,000	456		
23		Khaki	31,000	531		
24		Olive	49,000	688		
25						
26						

Values are blank, but province names are still included in Column B.

If you wished to map the data in the preceding example by state, you would need to create a new spreadsheet that **aggregated** the data. For the state named “Plateau,” for example, the population figures in column C for provinces Red, Blue, and Green would need to be added together. For an illustration, see the following table:

	A	B	C
1	State	Population	
2	East Central	1,120,000	
3	Highlands	315,000	
4	Northern	103,000	
5	Plateau	1,650,000	
6	Riverside	3,312,000	
7	Southern	972,000	
8	West Central	446,000	
9			
10			

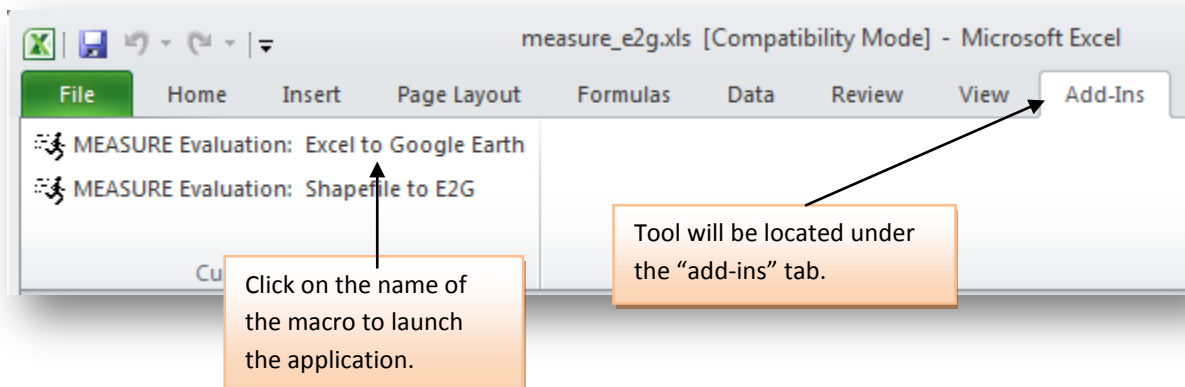
Aggregated Population Figures.

Remember, to verify the list of administrative division names in your data files with the ones included with the mapping tool, see the list of administrative division names for your country, which are located in your country's data folder as follows:

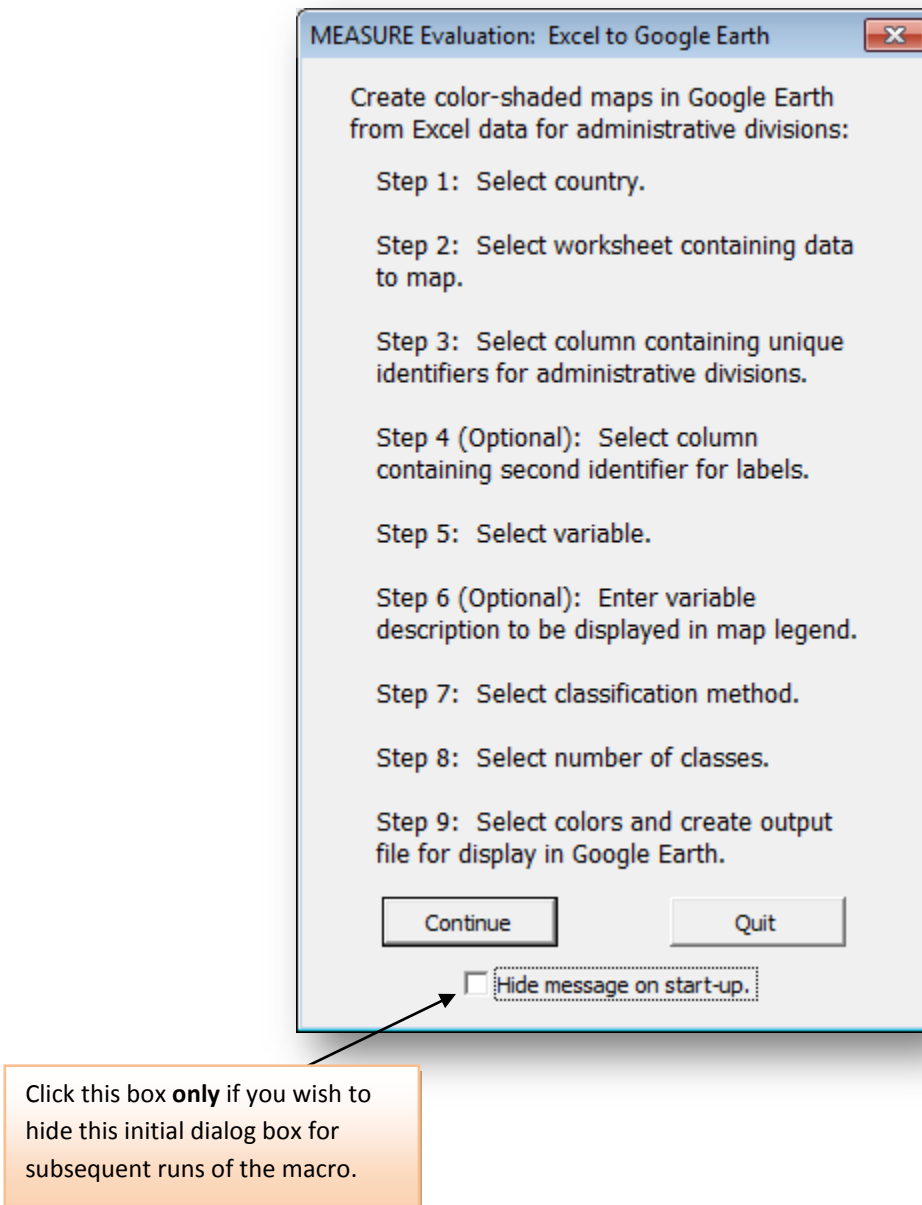
**YourInstallDirectory\measure_e2g\\YourCountryAbbreviation\
_YourCountryAbbreviation_ADMIN1_LIST.TXT (all countries)
_YourCountryAbbreviation_ADMIN2_LIST.TXT (all countries except Dominican Republic and Lesotho)**

MAPPING YOUR DATA USING THE MACRO

After enabling the macro and verifying the readiness of your data, click on the custom toolbar that launches the mapping tool (see following graphic from Excel 2010).



The first time you launch the macro, you'll see the following dialog box:



If you don't want to see the preceding dialog box the next time you start the application, set your preference by checking the box at the bottom of the screen.

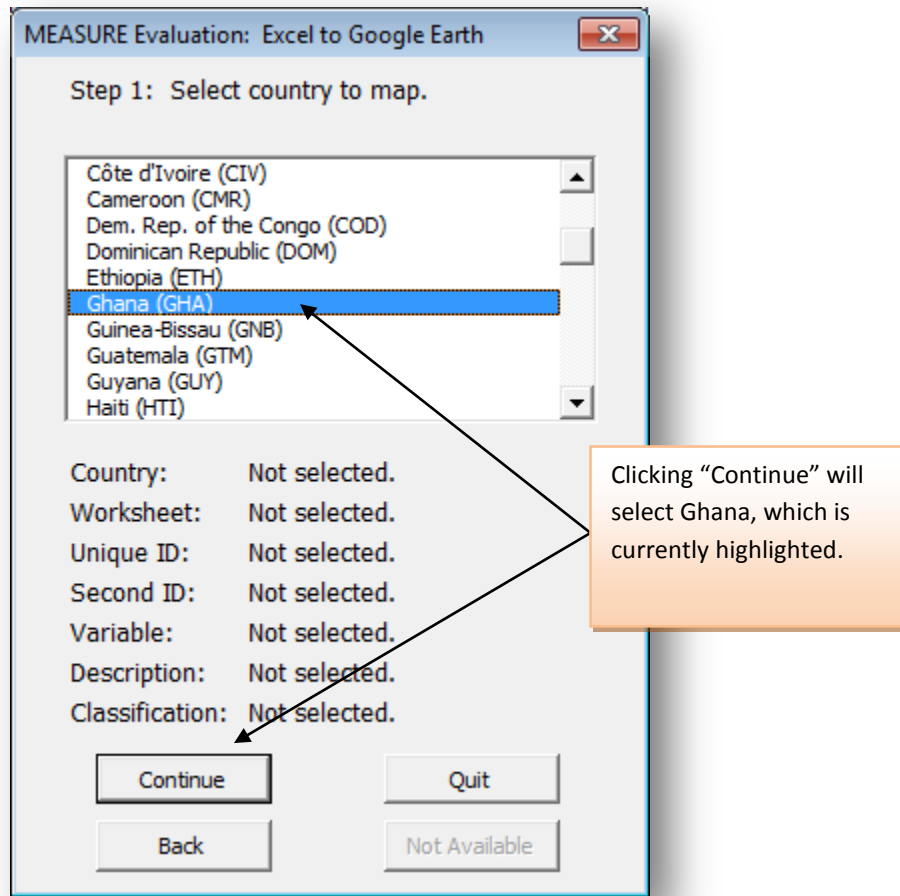
To advance to Step 1, press the return key (marked "Enter" or "Return") on your keyboard or use your mouse to click on the "Continue" button.

Step 1: Select country to map.

You will see a list of all countries for which administrative division boundary coordinates have been provided.

For more information on the data sources used, please see

YourInstallDirectory\measure_e2g\coordinates\YourCountryISO\XXX_METADATA.xml.



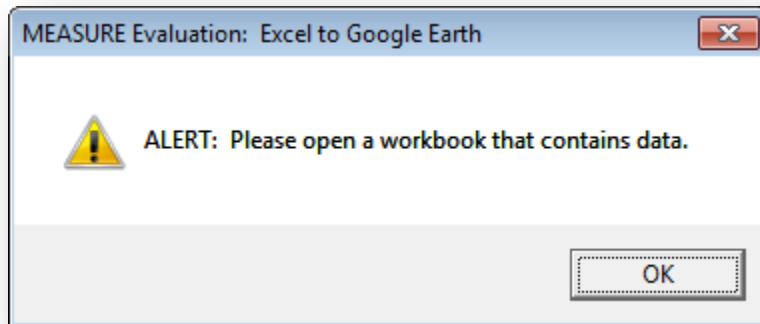
To select a country, use one of the following methods:

- A. Highlight the country name by clicking on it with the mouse, and then click the "Continue" button.
- B. Scroll through the list of country names using the up and down arrow keys on your keyboard, and then simply hit the return key (marked "Enter" or "Return") on your keyboard (the "Continue" button is set as the default action for the return key).

Selecting a country will set it as the default value for the next time you launch the mapping tool.

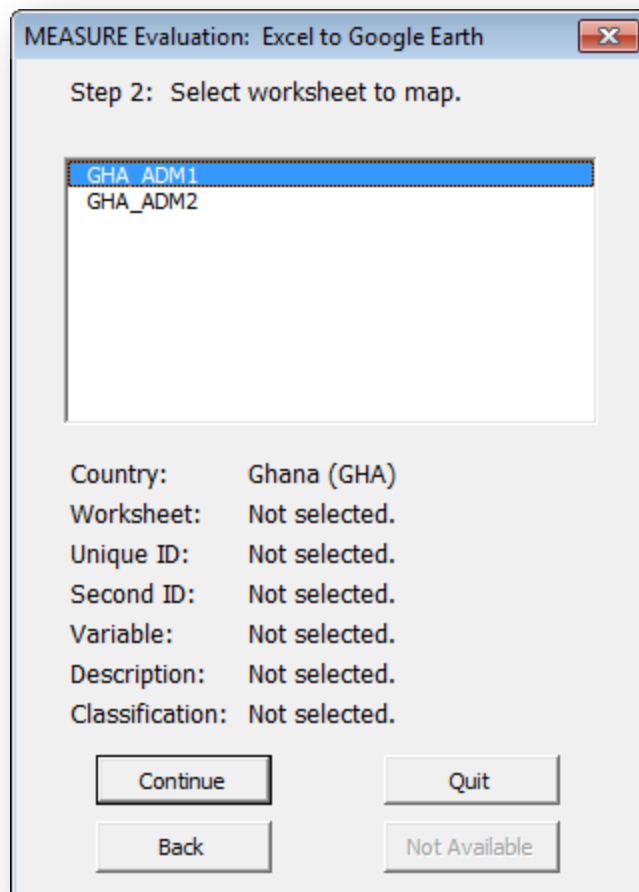
Step 1, continued: Open an Excel workbook that contains the data to be mapped.

If measure_e2g.xls is the only workbook you have open, when you select the return key you'll see the following message:

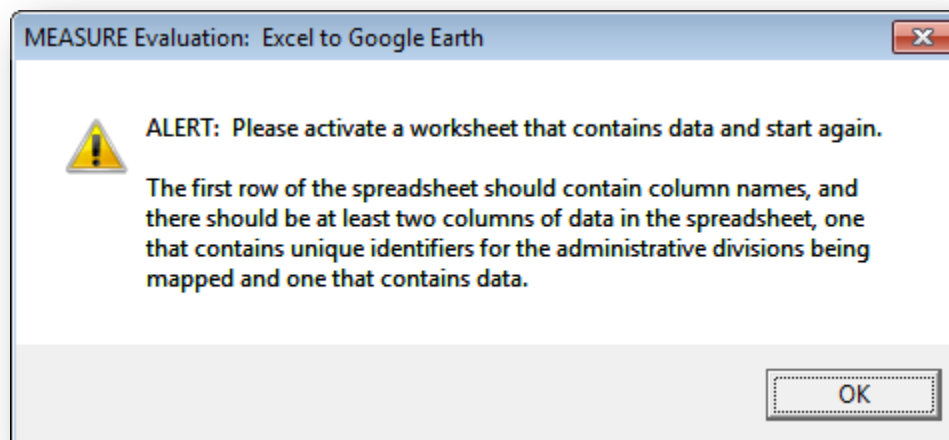


Click OK, and with Excel still open, navigate to a workbook containing the data you'd like to map, and open it. Selecting a workbook will set your preference for the data input directory you would like to use the next time you launch the mapping tool. If you'd like to start with the practice spreadsheet that came with the tool, navigate to **YourInstallDirectory\measure_e2g\data** and locate your country's sample Excel spreadsheet.

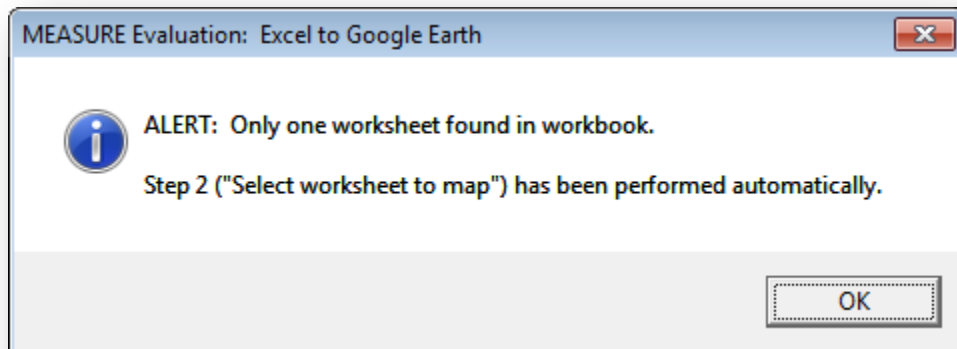
When you launch the macro within measure_e2g.xls, if you have two or more workbooks open that contain worksheets with data, you'll be taken to **Step 2:**



If you launch the macro from within an active workbook that contains **no data**, you'll see the following message:

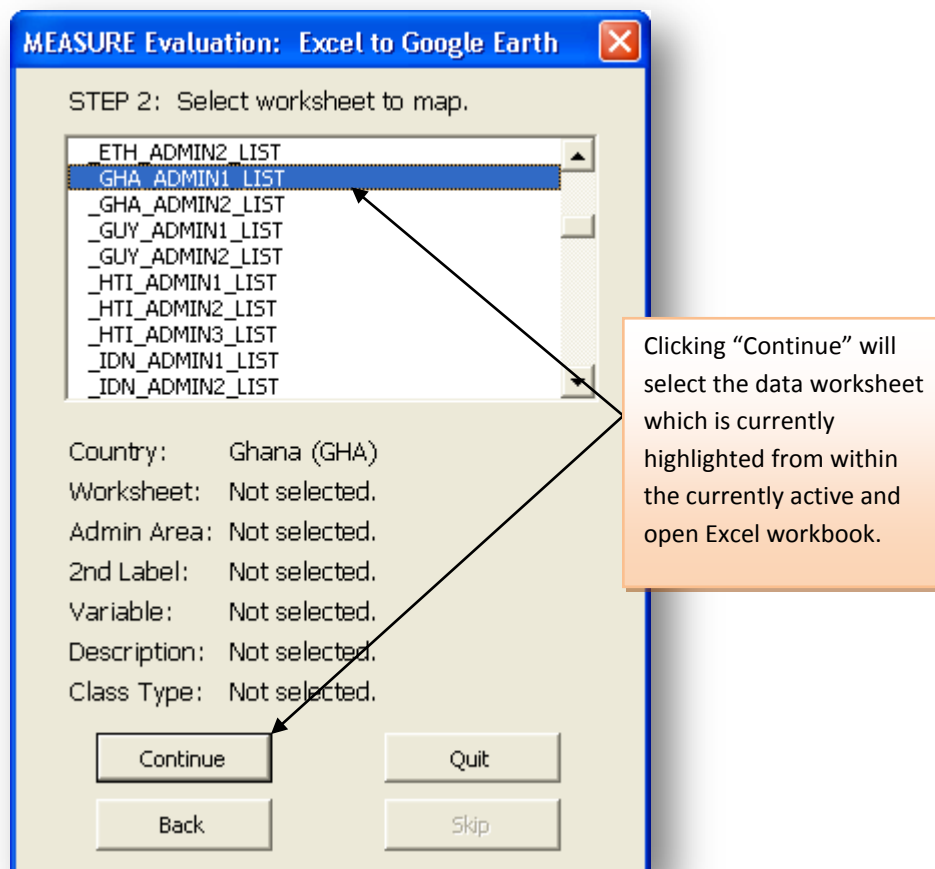


If you have only one other workbook open and it contains data, the macro will activate (switch to) that workbook and advance to step 2.



Step 2: Select worksheet to map.

The data you want to map must be on a worksheet in the currently active and open Excel workbook. Step 2 allows you to choose the **worksheet** containing the variables you wish to map.



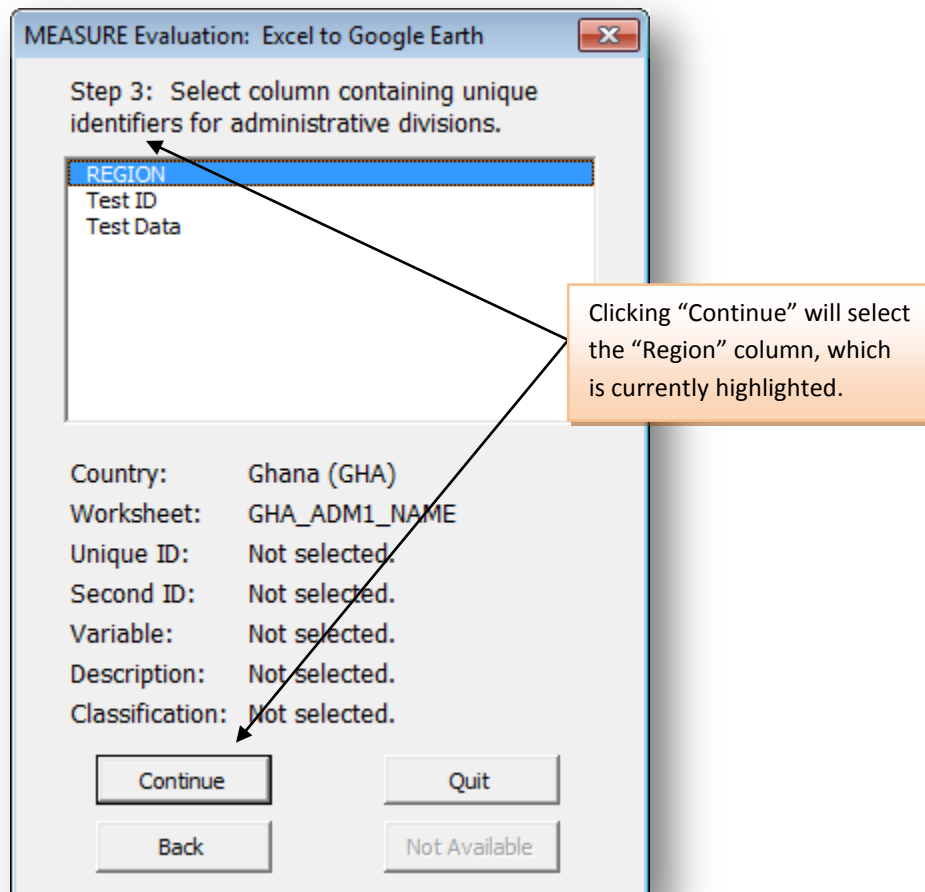
To select a worksheet, use one of the following methods:

- A. Highlight the name by clicking on it with the mouse, and then click the “Continue” button.
- B. Scroll through the list of names using the up and down arrow keys on your keyboard, and then simply hit the return key (marked “Enter” or “Return”) on your keyboard (the “Continue” button is set as the default action for the return key)

Step 3: Select field containing unique identifiers.

Select the field that contains either the administrative names or the codes for the geographic areas that are being mapped.

IMPORTANT: As noted earlier, there must be a one-to-one match—including count, order, capitalization, and spelling—between the administrative division names (or codes) in your spreadsheet and the administrative division names (or codes) in the coordinates files; otherwise, the mapping tool will produce an error message.



To select a geographic boundary field and continue, use either of the two methods described previously.

Note: The **name** of this field can contain any ASCII standard characters, including those with accents, but cannot contain any special symbols (such as \$ or #).

Step 3a asks you to select the corresponding coordinates file.

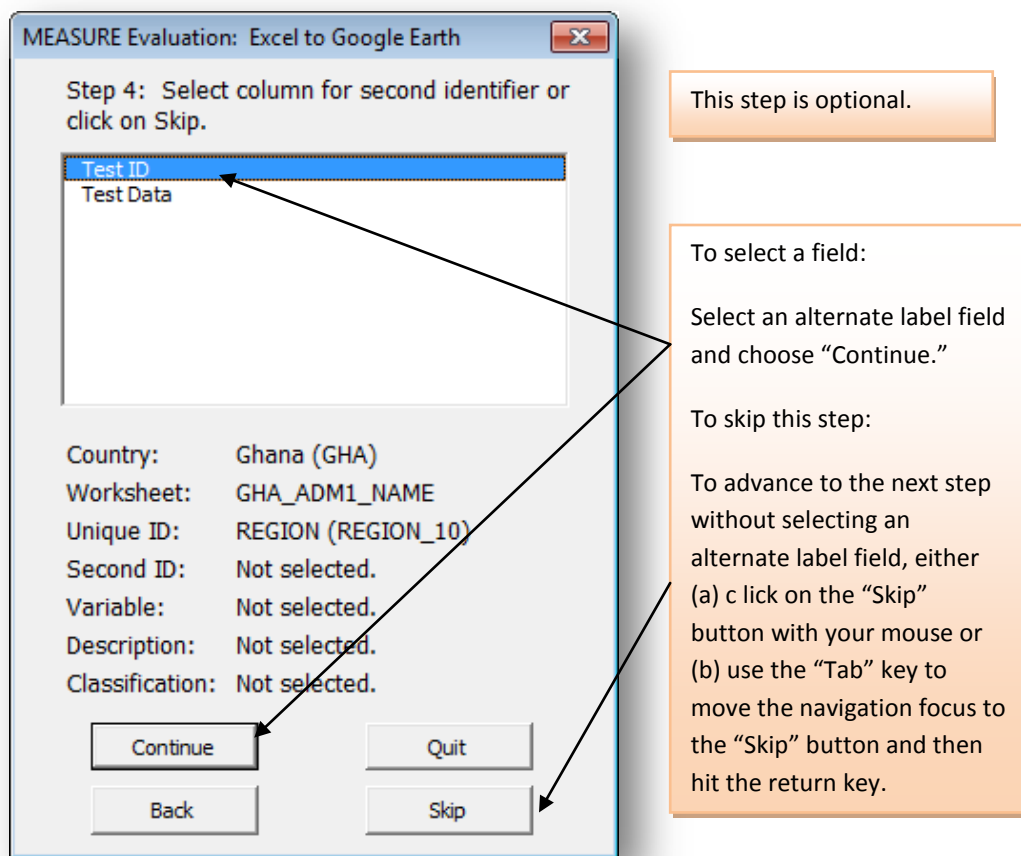
The tool will look in the \measure_e2g\coordinates\ folder for the country you are working with. Most countries will have 2 choices, for example, districts or regions. (The number in the name indicates the number of administrative units at that particular subdivision level.)

The screenshot shows a dialog box titled "MEASURE Evaluation: Excel to Google Earth". The main heading is "Step 3a: Select the corresponding coordinates file." Below this is a list box containing two items: "DISTRICT_110" and "REGION_10", with "REGION_10" selected. Below the list box are several fields: "Country: Ghana (GHA)", "Worksheet: GHA_ADM1_NAME", "Unique ID: Not selected.", "Second ID: Not selected.", "Variable: Not selected.", "Description: Not selected.", and "Classification: Not selected." At the bottom are four buttons: "Continue", "Quit", "Back", and "Metadata". The "Metadata" button is highlighted with a dashed border.

NOTE: If you would like to review the metadata for a particular file, you can click on the Metadata button (the Back button, in Step 3b, will return you to this screen.).

Step 4 (optional): Select alternate (2nd) label or click Skip.

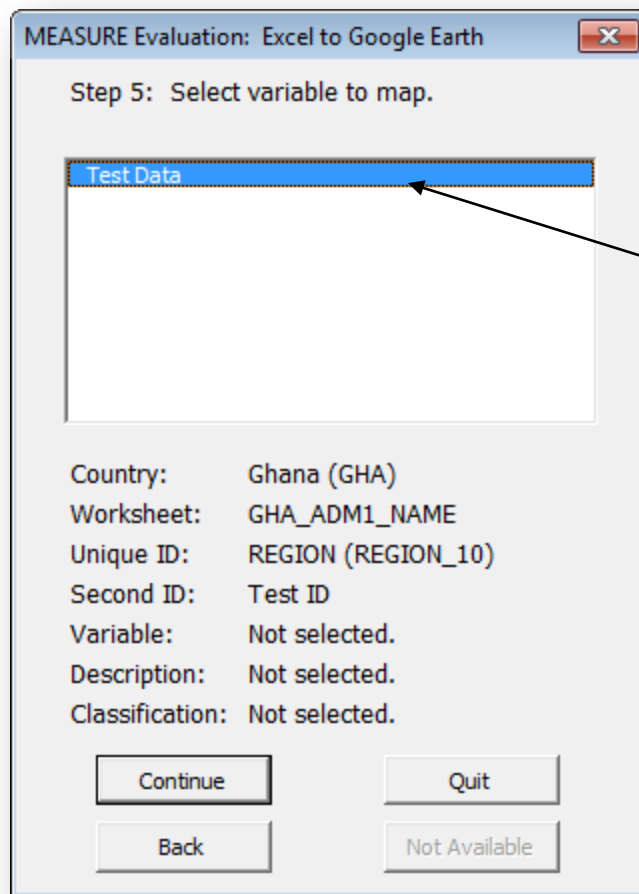
Optional: Choose a field that contains a secondary or alternate label to display in Google Earth along with each administrative division name. An example might be a unique identifying number.



To continue without using an alternate boundary label, select Skip.

If no alternate column exists, the program will advance automatically to step 5.

Step 5: Select variable to map.



In this example, the user has chosen to map a variable called "TEST_VAR1, which contains a value for the percentage of orphans in each province.

Click "Continue".

Step 6: Enter variable description. (Optional)

Delete the instructions and type in a description for the variable you are mapping. This description will appear in the legend and in the main text balloon for the layer you create within Google Earth.

MEASURE Evaluation: Excel to Google Earth

Step 6 (Optional): Enter variable description to be displayed in Google Earth legend.

Percent Orphans

Country: Ghana (GHA)
Worksheet: GHA_ADM1_NAME
Unique ID: REGION (REGION_10)
Second ID: Test ID
Variable: Test Data
Description: Not selected.
Classification: Not selected.

Continue Quit
Back Not Available

In this example, the user has chosen the variable description "Percent Orphans" by **typing this new text into the box in place of the default text.**

FOR ADVANCED USERS ONLY: This description can contain **well-formed** XHTML; however if you use XHTML and there is a syntax error in your code, the Keyhole Markup Language (KML) file generated by the mapping tool will not open in Google Earth. As a result, you will not be able to display your data in Google Earth until the syntax error in the KML file is fixed. Although you can fix syntax errors by editing the KML file directly, it's better to avoid having to do this by using well-formed XHTML in the variable description text box. If you decide to use XHTML in your variable description, there is a Google Earth idiosyncrasy of which you need to be aware: font tags must be closed before line breaks. For example, if you want to separate two lines of text with a break tag, but want to make both lines bold:

If you type `Line 1
Line 2`, in Google Earth you will see the following incorrect representation:

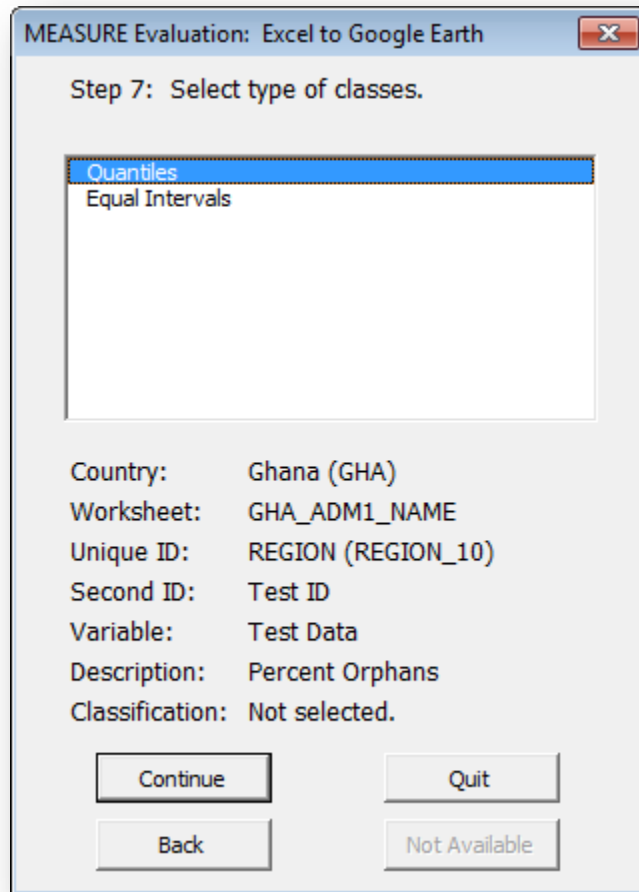
Line 1
Line 2

You can fix this problem and make both lines bold by using the following code:

`Line 1
Line 2`

To enter a carriage return within the variable description text box, use the keyboard combination **CTRL+ENTER**. This formatting will occur only within the clickable text balloon for this layer once it generates in Google Earth. Special formatting will not appear in the legend.

Step 7: Select type of classes for data.



The two choices currently available are Quantiles and Equal Intervals:

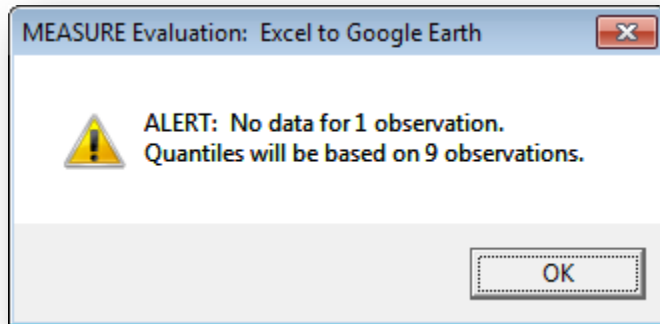
Quantiles will attempt to divide your data into classes containing an equal number of observations based on the number of classes you select in the next step.

Equal Intervals will create map classes by dividing your range of data values (lowest value to highest value) by the number of classes you select in the next step.

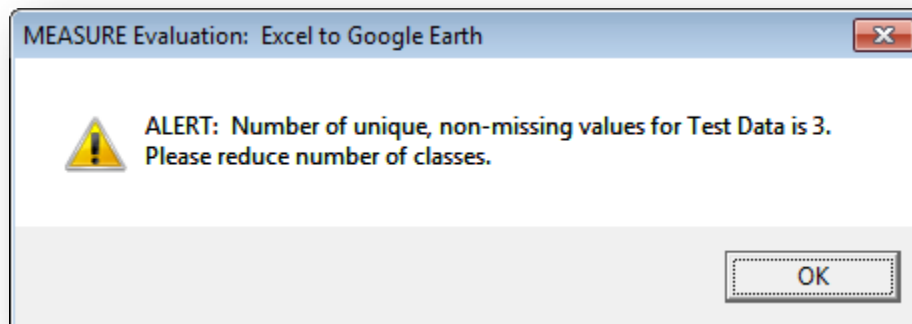
NOTE: Classed data values will be displayed in Google Earth using the maximum number of decimal places found in the original data in your Excel worksheet. That is, integer data will result in integer values, and a column of data in your spreadsheet that contains values with a maximum of three decimal places will be displayed in Google Earth using data ranges rounded to three decimal places.

Step 8: Select number of classes.

The number of classes that can be selected ranges from a high of five (the default value) to a low of two. Click on “Continue” or hit the return key to advance. After choosing to continue, if your worksheet contains any rows for administrative divisions with **no data** you’ll see a message like the following:

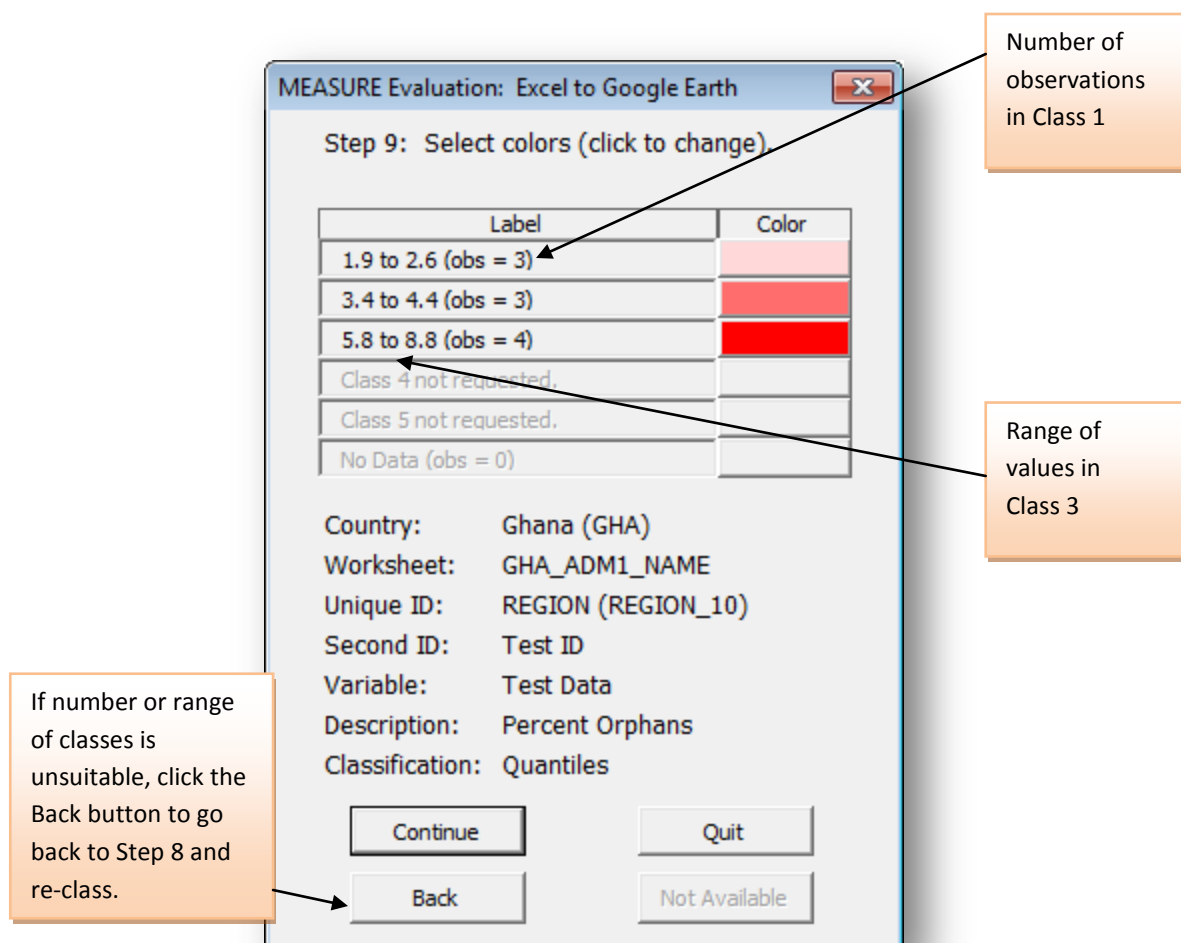


If you request a number of classes that is higher than the number of unique, non-missing values in the data column you wish to map, you’ll receive a warning message. For example, if you choose five classes for a variable that has only three unique, non-missing values, you will see a message like the following:



Step 9: Select colors (click to change).

This screen will display the number of classes you have chosen, and will show you the range of each class and number of observations per class. If you do not like the results of step 8, which classed the data, you can return to that step by clicking on the “Back” button. This screen will also allow you to change the class labels and colors that appear in Google Earth:



With respect to **labels**, you can **edit them as you wish**. To move from one label to another, you can click on them with your mouse or use the Tab key on your keyboard (use Tab to move forward, and the combination Shift+Tab to move backward).

The number format of the default range for each class is based on the data format of the cells in the original spreadsheet. For example, if the original data was formatted to the nearest integer value, the range will also display integer values. If the original data uses commas instead of decimals, the range will display the same comma usage.

To change the color gradient for all classes, click on any color. **Clicking on a color** will send you to the screen for Step 9a.

Step 9a: Select new gradient or single color clicked.

MEASURE Evaluation: Excel to Google Earth

Step 9a: Set new gradient or color clicked.

Clicking "Flip" toggles the order of colors for an entire gradient from light to dark, or from dark to light.

Clicking on the "Set" button is required to select and change the color gradient.

To change the map color for a single class:
Click on the colored button to launch the Windows color palette and select a new color.
Or type in red (R), green (G), and blue (B) values. Values range from 0 (no color) to 255 (brightest).
Then hit the "Set RGB" button.

Select New Gradient

To change the color gradient to one of the gradients provided in the mapping tool, simply press the "Set" button next to the one you prefer. If you'd like to reverse the order of the colors in a gradient, click on the "Flip" button before selecting the corresponding "Set" button. Reset the order of colors by clicking again on the "Flip" button.

To access a second and third set of gradients, press the arrow button beside the words "Change Gradients Displayed."

IMPORTANT: To change the color gradient, you **must select the "Set" button next to a gradient** (see above illustration). The gradients can be changed on the top half of the screen only, as the bottom half of the screen controls just the color for the particular box you clicked on to access the Step 9a screen. A color gradient change does not affect the color used for the "No Data" class (if that class applies to the data you are trying to map).

Change Color Clicked

To change the color for a single class (such as the “no data” class), click on the color you wish to change. You will see the screen for Step 9a as shown above.

To change the single color, simply edit the values in the R (red), G (green), and B (blue) value entry boxes on the lower half of the screen. Values can range from 0 to 255. Entering any other value in any of the boxes—including deleting the contents of a box—will produce an error message and reset the value. To move between the RGB boxes, use the Tab key to move forward and the Shift+Tab combination to move backward. To set the new color, either (1) click on the “Set RGB” button with your mouse or (2) press the return key on your keyboard, as the button “Set RGB” is set as the default action for this screen.

IMPORTANT: To change just the color clicked, you **must select the “Set RGB” button on the lower half of the screen**. The upper half of the screen is reserved for changing the entire color gradient.

Whether you change a single color or select a new color gradient, once you set your choices you will be returned to the original screen for Step 9.

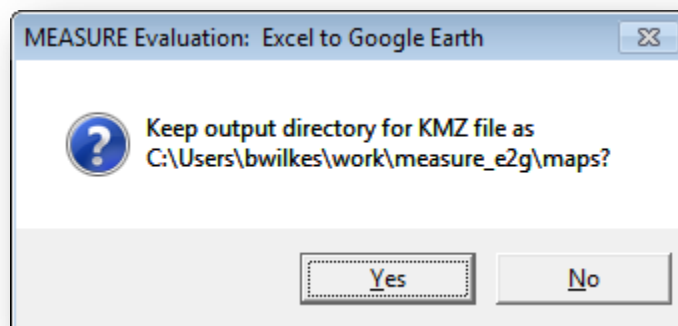
Step 9 (continued): Map Generation

Once you are back at the main screen for Step 9 and are satisfied with your classes, class labels, and color choices, simply click on the “Continue” button or press the return key on your keyboard (the “Continue” button is set as the default action on this screen). Pressing the “Continue” button will initiate the generation of a file in the Keyhole Markup Language (KML) format, which is required by Google Earth for you to map your data. The KML file is compressed to reduce file size and accelerate display, so is created as a KMZ file, which means “Keyhole Markup Language, Zipped.”

The first step in the generation of the KMZ file is to select where you would like to store the file on your computer system. The mapping tool default is as follows:

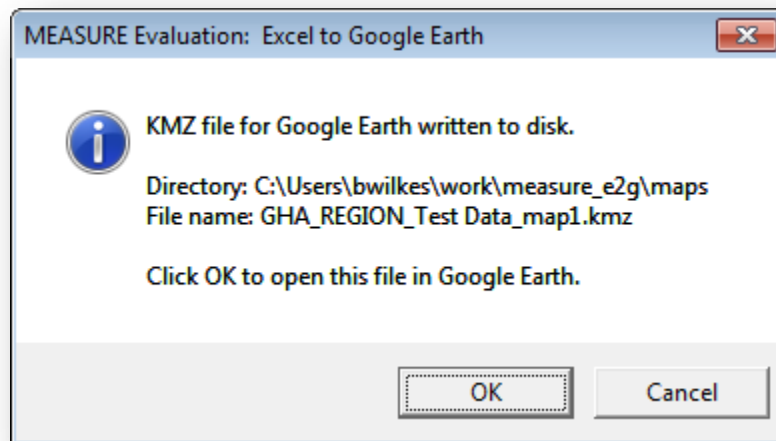
YourInstallDirectory\measure_e2g\maps

Based on the default value set for the KMZ maps directory, you will see something similar to the following screen:



If you would like to keep this directory, simply select “Yes.” If you want to change it, select “No” and then navigate to and select a new directory.

Selecting a KMZ output directory will set your preference for the next time you launch the mapping tool. After selecting the output directory, you will see a progress screen as your map is created, and then a message like the one below.



If you click OK and Google Earth is installed on your computer and set as the default program for opening KML and KMZ files, Google Earth will open and display your file. If you choose Cancel, Google Earth will not launch, but the KMZ file has been created and can be launched later.

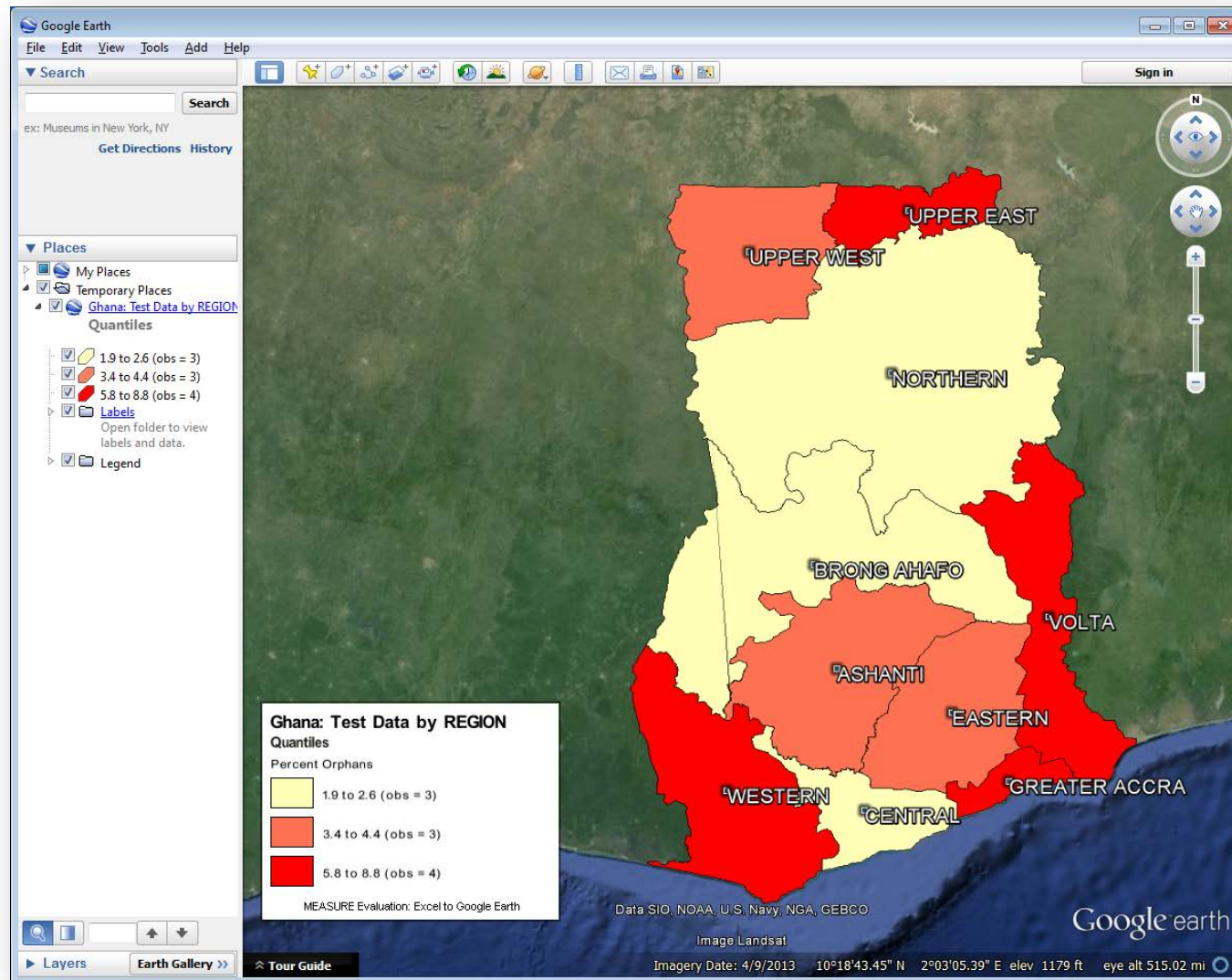
Remember, the KMZ output file is placed in your ...**\measure_e2g\maps** folder, and is named using the following convention:

YourCountryAbbreviation_AdminFieldName_VariableFieldName_map1.kmz

Note that if you attempt to create a file with a name that has already been used in the chosen KMZ output directory, the KMZ file name is automatically incremented by a value of 1 (i.e., _map1.kmz, _map2.kmz, etc.).

WARNING: If there is an XHTML error in the variable description form (step 6), Google Earth may not be able to open your KMZ file. To remedy this, you can change (rename) the extension of the KMZ file from .kmz to .zip, extract the .kml file from the zip archive, change (rename) the .kml file name extension to .xml, and open the XML file in a Web browser to see the XHTML error message. This will allow you to determine the specific syntax error that has occurred so you can avoid the error the next time you create a map.

Assuming you have used well-formed XHTML and have been able to open your map in Google Earth, you should see something like the following:



The following graphics show details for the key map features in the Google Earth sidebar.

The screenshot shows the Google Earth sidebar with the following elements and callouts:

- Search**: A search bar at the top.
- Places**: A folder containing:
 - My Places**: A folder icon.
 - Temporary Places**: A folder icon.
 - Ghana: Test Data by REGION**: A folder icon with a blue arrow pointing to it. Callout: "Click on the name of your map as shown above to generate the following information box:"
- Quantiles**: A folder icon with a blue arrow pointing to it. Callout: "This label is generated for you automatically as **CountryAbbreviation: VariableFieldName by AdminFieldName**. Click on this label to display the full variable description you entered in Step 6 (see graphic below)."
- Classes**: A list of three classes with checkboxes:
 - ☒ 1.9 to 2.6 (obs = 3)
 - ☒ 3.4 to 4.4 (obs = 3)
 - ☒ 5.8 to 8.8 (obs = 4)
 Callout: "The type of classes you chose in Step 7."
- Labels**: A folder icon with a blue arrow pointing to it. Callout: "Classes, ranges, and number of observations per class are displayed here."
- Legend**: A folder icon with a blue arrow pointing to it. Callout: "A legend is generated in the form of a screen overlay, and can be turned on and off by toggling here."

Below the sidebar, a callout box titled "GHA: TEST_VAR1 by ADMIN1 Quantiles" is shown. It contains the following elements and callouts:

- Percent Orphans**: A text label.
- Logos**: Logos for USAID and MEASURE Evaluation. Callout: "These icons can be clicked on to access the corresponding Web sites."
- Disclaimer**: A text block stating: "This macro is distributed by MEASURE Evaluation. MEASURE Evaluation is funded by the U.S. Agency for International Development (USAID). This application and the boundary files included in the application are not official U.S. Government information and do not necessarily represent the views of USAID or the U.S. Government."

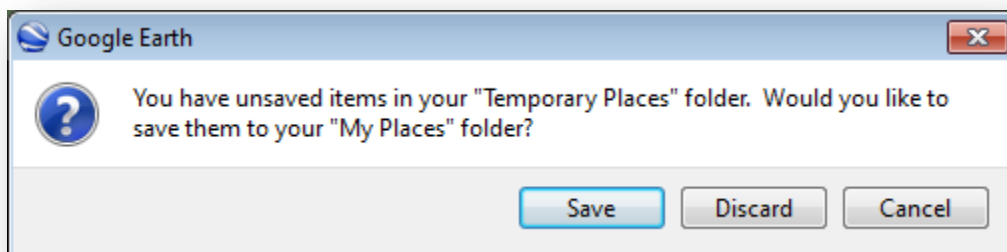
As shown in the preceding graphic, placemark names and attribute data can be turned on and off in Google Earth. Also, in order for you to display your map properly, it may be necessary for you to turn off other layers, especially those provided by Google Earth (e.g., Geographic Web or Borders and Labels). Zooming in to complex areas will move label positions and aid in label viewing.

IMPORTANT: If you are generating more than one map in Google Earth, you will want to turn off the ones you are not currently viewing. Do so by using the associated check boxes in the sidebar. Otherwise, the display (especially the legend that appears in the main map window) will become cluttered as each subsequent map overlay interferes with the ones previously generated.

EXPORTING AND PRINTING

The original KMZ file resides in your “maps” folder and will be available for viewing in Google Earth at a later time, or can be sent to others so that they may also view it in Google Earth. Alternatively, the map can be exported from Google Earth as a JPEG image, by using the menu combination **File > Save As > Save Image**, or by using the keyboard combination **CTRL+ALT+S**.

NOTE: When you close Google Earth, you may get the following message:



“Save”, at this point, simply means your map will be opened automatically the next time you open Google Earth. Even if you do not save and choose “Discard”, your E2G-generated KMZ file will NOT be lost. The original will still be safe in your “maps” folder, where it was originally placed.

For more information on using Google Earth, see <http://earth.google.com/userguide/>.

The next portion of this tutorial covers how to convert your own GIS files into coordinate files that will work with the E2G tool.

S2E: CONVERTING YOUR OWN SHAPEFILES FOR USE WITH THE E2G TOOL

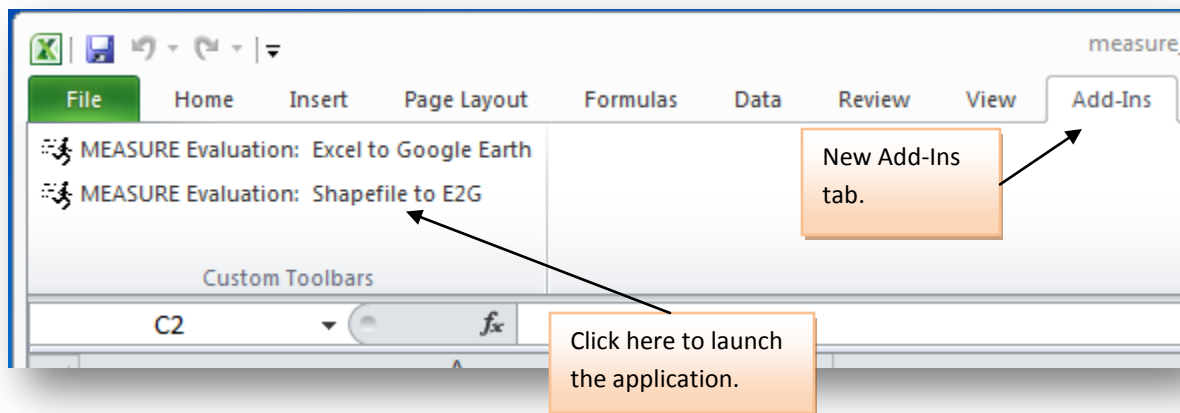
Version 3.0 of the E2G tool comes with an additional feature: the ability to customize your own coordinate files.

This feature requires that you have a GIS file called a **shapefile**, which is actually a collection of 3 (or more) files with the same name but the extensions .shp, .shx, and .dbf (at a minimum). Shapefiles are widely available and a common way of storing geographic data. Popular full-featured GIS programs such as ArcGIS and QGIS can export to the shapefile format, and a number of online mapping organizations and government statistics offices make their data available in this format.

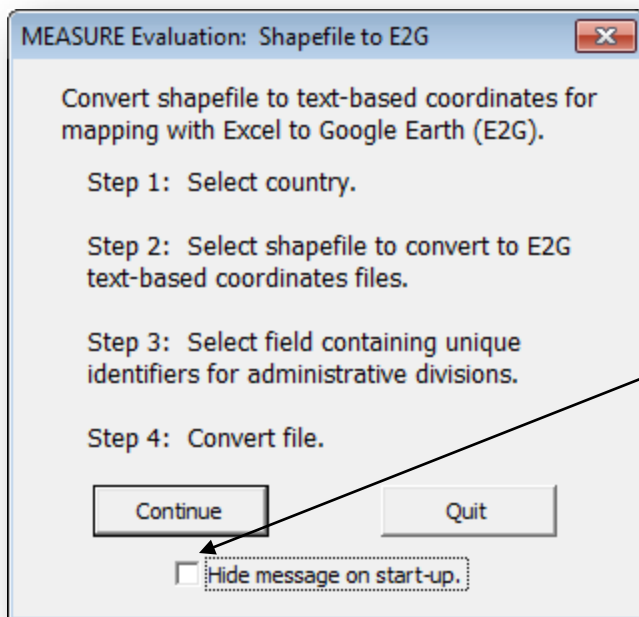
The S2E feature allows for the conversion of shapefiles into coordinate files that can be used with the E2G tool.

NOTE: Your shapefiles must include a projection file component (.prj) and this projection must use the WGS84 datum (earth model), with latitude/longitude coordinates. (Please see the metadata for your GIS data source for more information on the projection of your particular shapefile.)

To use the S2G feature, click on the “Shapefile to E2G” macro in the Add-Ins tab:



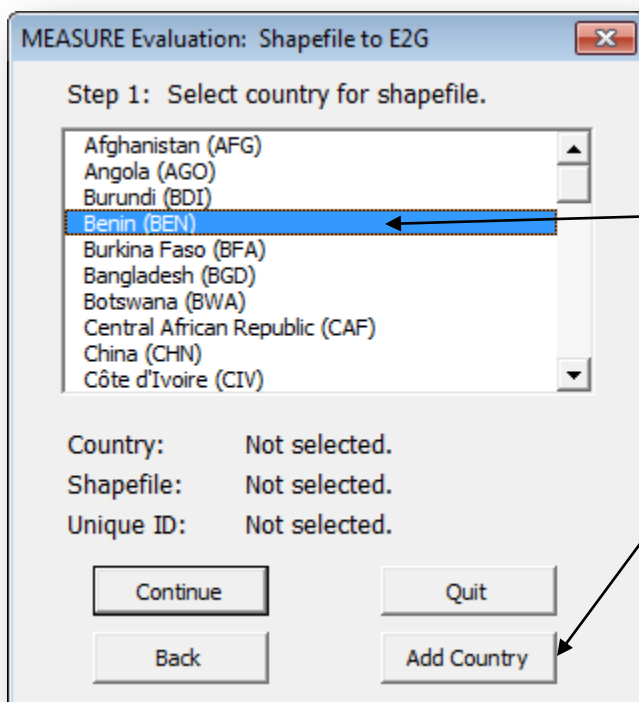
You should see the introductory screen for the tool, listing the steps involved:



Click this box **only** if you wish to hide this initial dialog box for subsequent runs of the tool.

Click on the “Continue” button to proceed.

Step 1: Select country for shapefile.



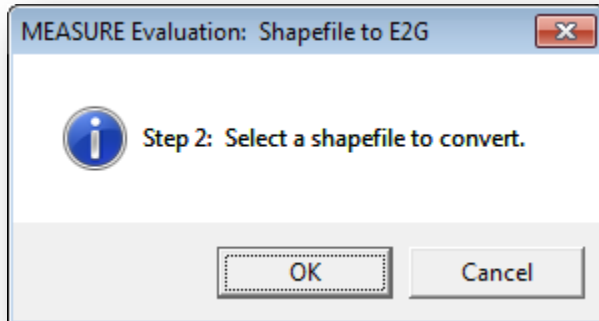
Select the country for which you want to make the boundary conversion.

(Click here if you do not see the country for which you are converting the file in this list. You will be able to add it from a list of all countries.)

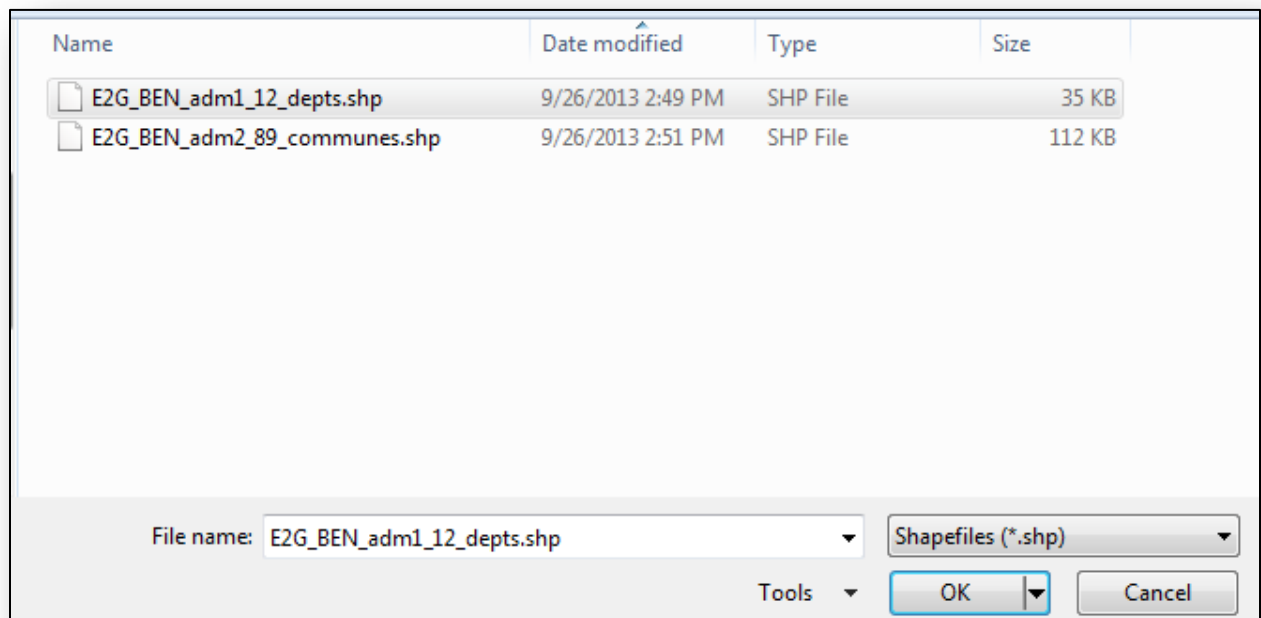
You will see a list of countries that have been used with this tool (your list may initially be shorter than the one shown here). If you do not see the country here that you would like to convert coordinates for, please click on “Add Country”, to add your desired country to the list. Once you see your country in the list, click on it to select it and then choose “Continue”.

Step 2:

You will see the following message:

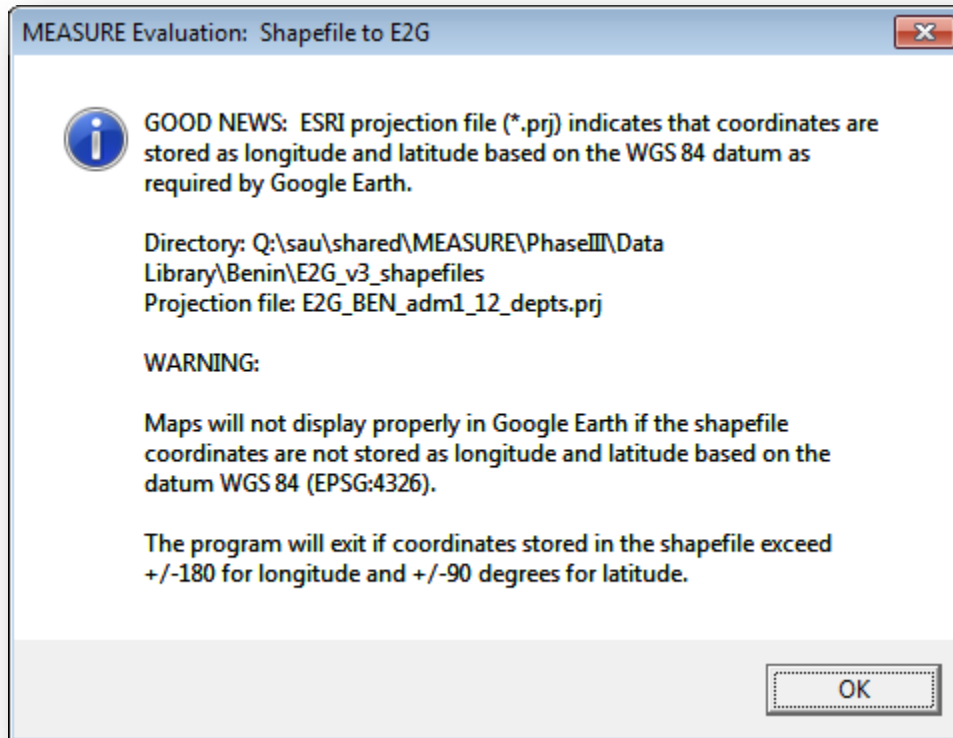


Click “OK” and browse to select the shapefile you would like to convert. (NOTE: These will show up in the subsequent browser box as single files with the extension .shp, despite actually being collections of several files. If the files in the folder you choose are for some reason NOT in shapefile format, then they will not show up in this browser box.)



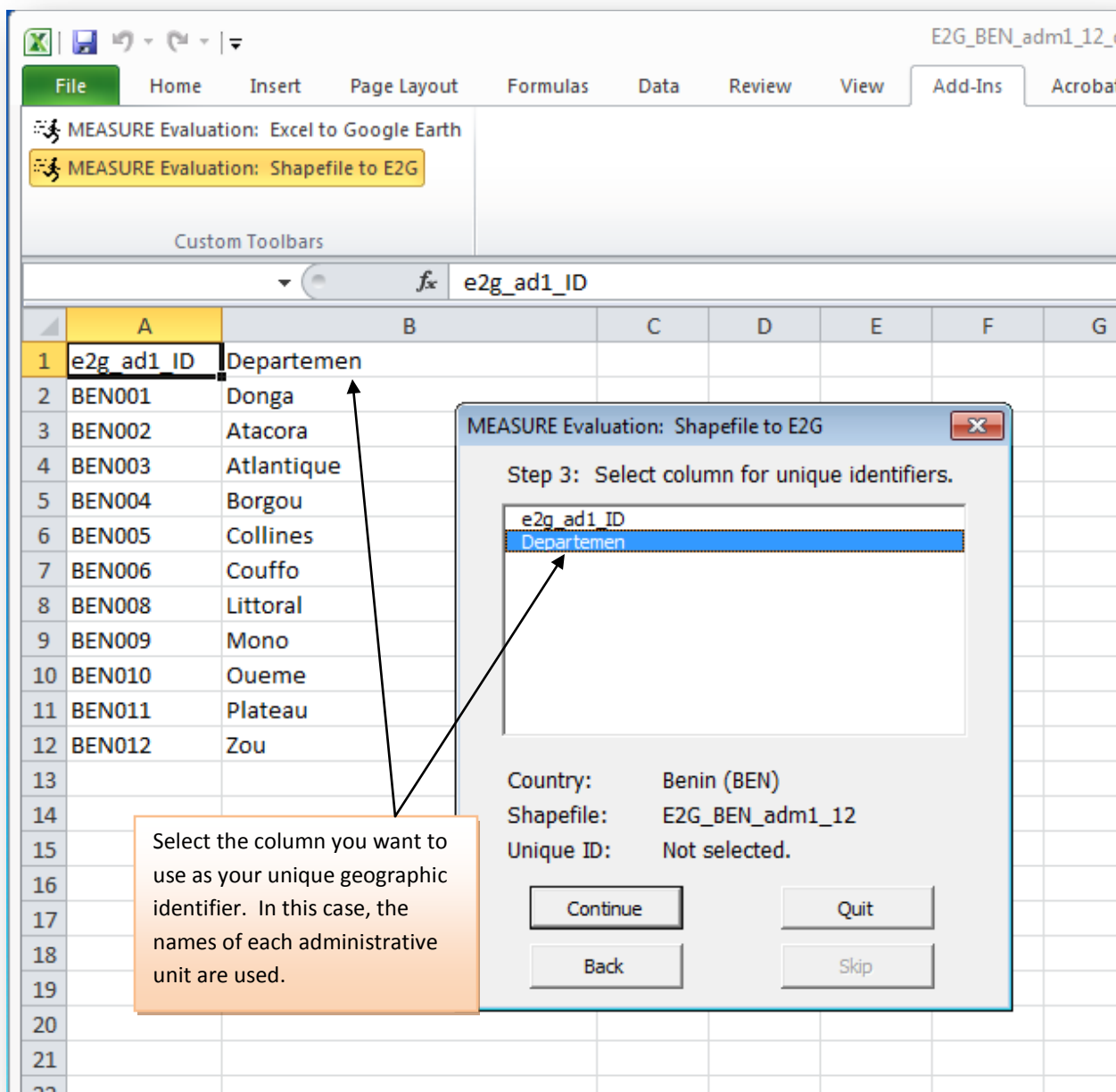
Remember, your shapefile **must** include information on its projection, which must be WGS84 lat/long. (see note on p. 35)

Click on the “OK” button and you should see the following message:



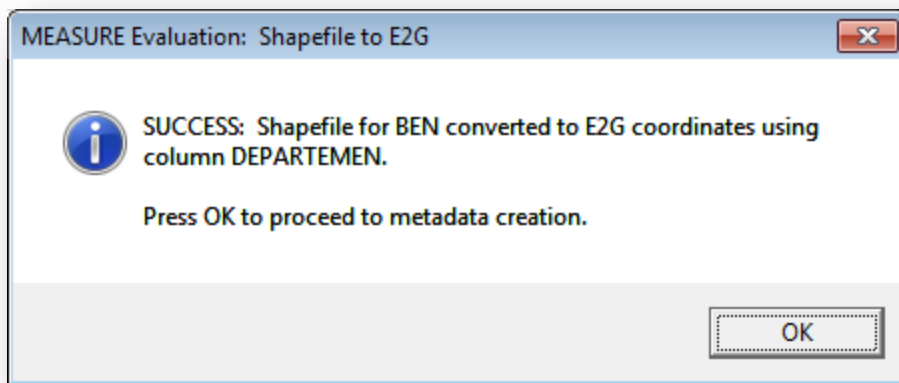
Click “OK” once more to go to step 3.

Step 3: Select column for unique identifiers:



In the example shown above, you have a choice. If you would like to use Departement names as the linking identifier between your coordinates file and your data, click on this column label and select “Continue”. If you would like to use another column, such as a code or variable spelling, select it now. Any data sheets you use with this file for mapping in the E2G tool will also need to contain these unique identifiers, so choose something meaningful.

Click “Continue,” and you will get a progress bar as your new coordinates file is created:



NOTE: If your file conversion is taking a long time (more than a minute or two), you may want to check the file size of your original shapefile. If the file size is large (much more than 2 Mb or so) then you may need to have a GIS technician run a program to simplify some of the linework. Extreme precision is not needed for the coordinates of a choropleth map, and it is easier to work with smaller file sizes.

Once your E2G coordinates file has generated, click OK.

Step 3a: Create metadata.

Metadata is “data about the data”. It is a very good idea, whenever you generate a new mapping file, to record in an accompanying file some information about where and when the data originated. Many shapefiles include a metadata component.

The S2E tool incorporates this idea and generates metadata which you can customize. Some of the information is included automatically, but wherever you see a white box, you can select the text and replace it with your own. So for “Administrative Level”, you might want to change the text to “Region” or “Departemente”. It’s a good idea to include the data collection date, if known, for the original shapefile, as well as the source of the shapefile and perhaps contact information for that source. In “additional notes”, you may want to put today’s date and your own contact information.

MEASURE Evaluation: Shapefile to E2G

Step 3a: Create metadata.

Unique Identifier Column
DEPARTEMEN

Metadata Output File Name
C:\Users\bwilkes\work\measure_e2g\coordinate

Country
Benin (BEN)

Administrative Level
Example: District

Administrative Division Count
11

Data Collection Date
Example: April 2011

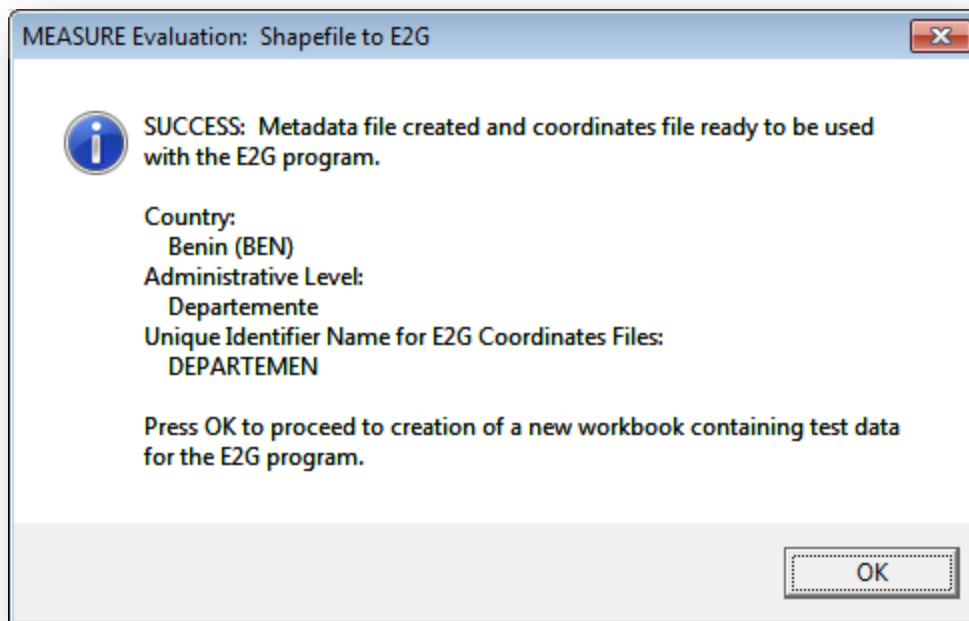
Data Source
Example: Rwanda Ministry of Health

Replace the text in these white boxes. In this case, drag the cursor to select "Example: District" and type in "Departement".

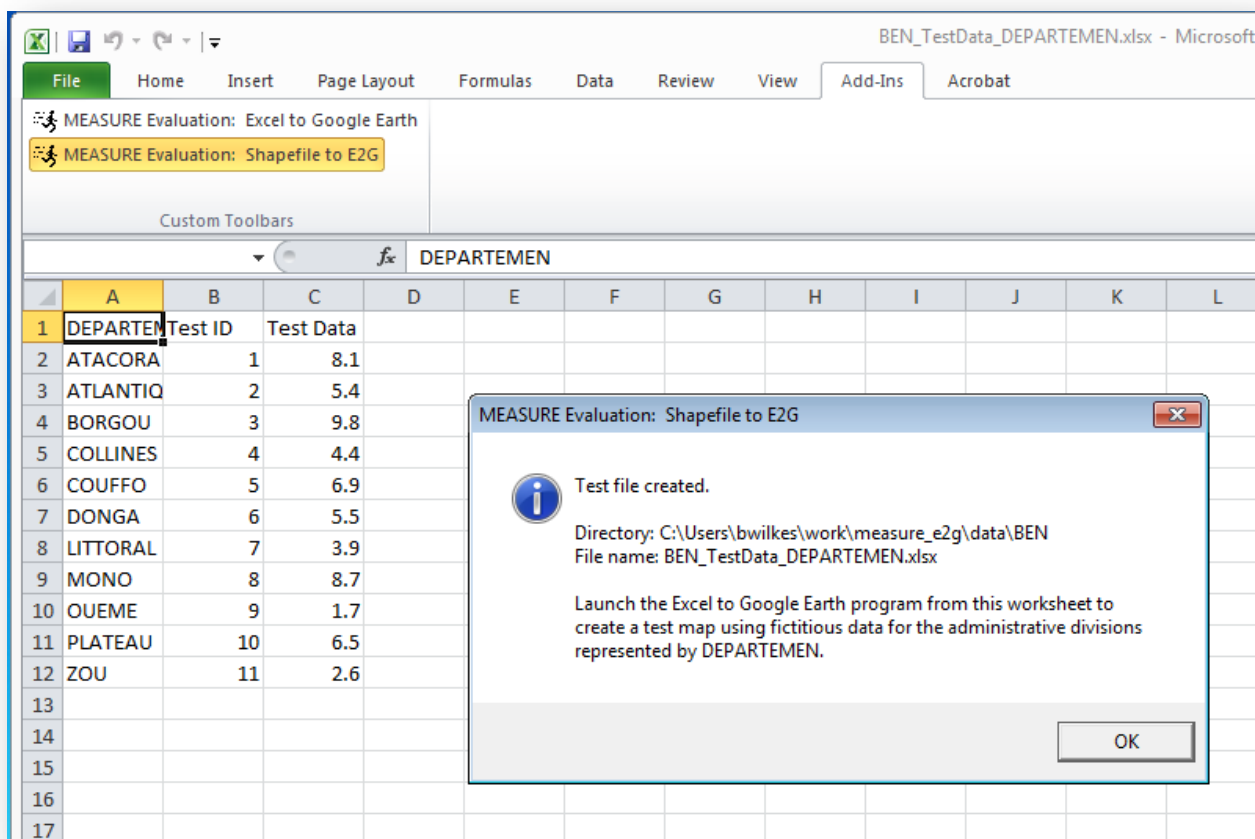
Input the date and source of your data here.

When you are done putting in your metadata information, scroll to the bottom of the box and click on "Continue".

You should see the following message:



Click on "OK". The program will generate an Excel file which contains "test data":



This file will be saved in the folder: **YourDirectory\measure_e2g\data**. Feel free to rename it if you wish. You can use it as a template to enter more data in the future, or simply use it to test out the tool.

If you visit your coordinates folder: **YourDirectory\measure_e2g\coordinates**, you should now see a new folder with your country's 3-digit ISO code. This folder contains:

- 1) the coordinates files generated by S2E, which are needed by the tool for mapping
- 2) a metadata file which contains the information you entered in step 3a. The metadata file can be viewed in either a web browser or a text viewer.

Your new coordinates are now ready for use with the E2G tool.

GETTING TECHNICAL SUPPORT

If you need technical support or have a suggestion you would like to make for a future release, please send an e-mail to e2ghelp@unc.edu.