

# Trends for Oil and Gas Terrorist Attacks

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## EXECUTIVE SUMMARY

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Although direct terrorist attacks on the oil and gas sector have not occurred in the United States, there are many recorded attacks on the sector in a large number of countries around the world. The statistical analysis and other evaluations of these data provide an important foundation for identifying case events that can be selected for an in-depth evaluation of the role of Supervisory Control and Data Acquisition (SCADA) in the disabling and rate of recovery of the oil and gas system.

This report analyzes international terrorist attacks using a database from the National Memorial Institute for the Prevention of Terrorism (MIPT) which includes information about terrorist attacks from all over the world affecting all sectors, including oil and gas. The report looks at annual data for the period 1990-2005 with a special emphasis on attacks occurring in countries with the highest number of attacks during this period. Section 1 provides an introduction to the report. Section 2 looks at the number of incidents, including total incidents over time, attacks on the oil and gas sector as a percentage of total terrorist attacks, and incidents over time by geographical region. In Section 3 the number of fatalities associated with the attacks is examined, along with the fatalities associated with attacks on the oil and gas sector as a percentage of all fatalities associated with terrorist attacks. Section 4 looks at injuries associated with the attacks, and the injuries associated with attacks on the oil and gas sector as a percentage of all injuries associated with terrorist attacks. Section 5 provides a brief discussion about the association between injuries and fatalities. Section 6 contains a discussion of the kinds of components attacked. Finally, Section 7 ends with some concluding remarks.

Although the terrorist attacks on the oil and gas sector are a relatively small proportion of terrorist attacks overall, the data show that a significant number of attacks have occurred over the period 1990-2005, suggesting that the sector is vulnerable. If terrorist groups feel that carrying out a physical attack within the United States is too difficult they could turn their attention to other vulnerabilities such as SCADA systems.



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## ACKNOWLEDGEMENTS

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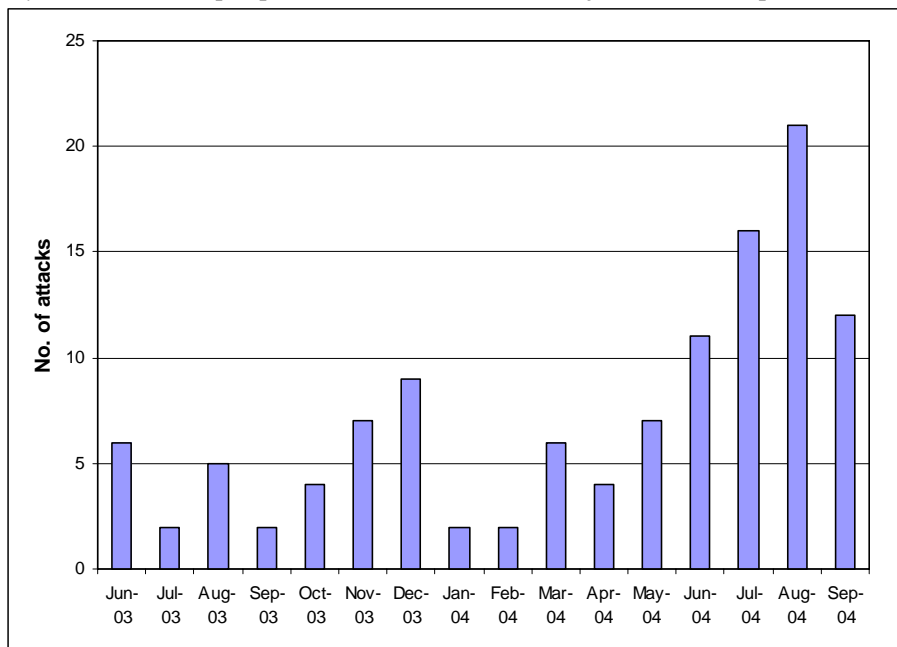
## SECTION 1: INTRODUCTION

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Although direct terrorist attacks on the oil and gas sector have not occurred in the United States, there are many recorded attacks on the sector in a large number of countries around the world. An analysis of these attacks is critical to gaining an understanding of the manner in which such attacks might occur in the U.S., and their potential consequences. Analyzing these attacks provides a better understanding of the frequency of attacks over time in each country, as well as within specific regions, which provides inputs into estimating consequences of an event occurring that can be extended to other oil and gas systems. Most importantly, the statistical analysis and other evaluations of these data provide an important foundation for identifying case events that can be selected for an in-depth evaluation of the role of Supervisory Control and Data Acquisition (SCADA) in the disabling and rate of recovery of the oil and gas system. Even if the SCADA systems may have disabled the oil and gas systems as a result of sheer physical attack rather than as a cyber attack, the mode of destruction potentially provides a mode of attack for terrorists.

The oil and gas sector has often been a target in armed conflicts. For instance, in Iraq numerous attacks on pipelines and oil installations have occurred since the war started. The figure below summarizes attacks by month for a 14 month period according to data from the Institute for the Analysis of Global Security.

Figure 1. Monthly Attacks on Iraqi Pipelines and Oil Installations: June 2003 – September 2004



Source: Graphed from data from the Institute for the Analysis of Global Security, IAGS Energy Security, "Iraq Pipeline Watch," September 23, 2004.

This report analyzes international terrorist attacks using a database from the National Memorial Institute for the Prevention of Terrorism (MIPT).<sup>1</sup> The MIPT database includes information about terrorist attacks from all over the world and affecting all sectors, including oil and gas. The report looks at annual data for the period 1990-2005 with a special emphasis on attacks occurring in countries with the highest number of attacks during this period. Section 2 looks at the number of incidents, including total incidents over time, attacks on the oil and gas sector as a percentage of total terrorist attacks, and incidents over time by

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<sup>1</sup> See National Memorial Institute for the Prevention of Terrorism (MIPT): <http://www.mipt.org>

geographical region. In Section 3 the number of fatalities associated with the attacks is examined, along with the fatalities associated with attacks on the oil and gas sector as a percentage of all fatalities associated with terrorist attacks. Section 4 looks at injuries associated with the attacks, and the injuries associated with attacks on the oil and gas sector as a percentage of all injuries associated with terrorist attacks. Section 5 provides a brief discussion about the association between injuries and fatalities. Section 6 contains a discussion of the kinds of components attacked. Finally, Section 7 ends with some concluding remarks.

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## SECTION 2: INCIDENTS

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The attacks on the oil and gas sector are concentrated in a few countries. Over the period 1990-2005 there were 330 reported incidents of terrorist attacks on the oil and gas sector recorded in the MIPT database. The attacks occurred in 30 countries. Only 8 of the 159 countries that had at least one terrorist incident from 1990 through 2004 had at least five incidents related to oil and gas installations over that time: Algeria, Colombia, Ecuador, Iraq, Pakistan, Philippines, Russia, and Turkey. For this reason, the other 152 countries have been combined into the category “Other.” Data for oil/gas attacks are given for 2005, but these only refer to part of the year, therefore, data for 2005 are included in the figures, but not in the statistical analysis.

### 2.1 Total incidents

The data on oil/gas terrorist incidents are summarized in the following time series plots for each of the eight countries mentioned above (including other).

Figure 2. Number of oil and gas incidents, 1990 - 2005: Algeria

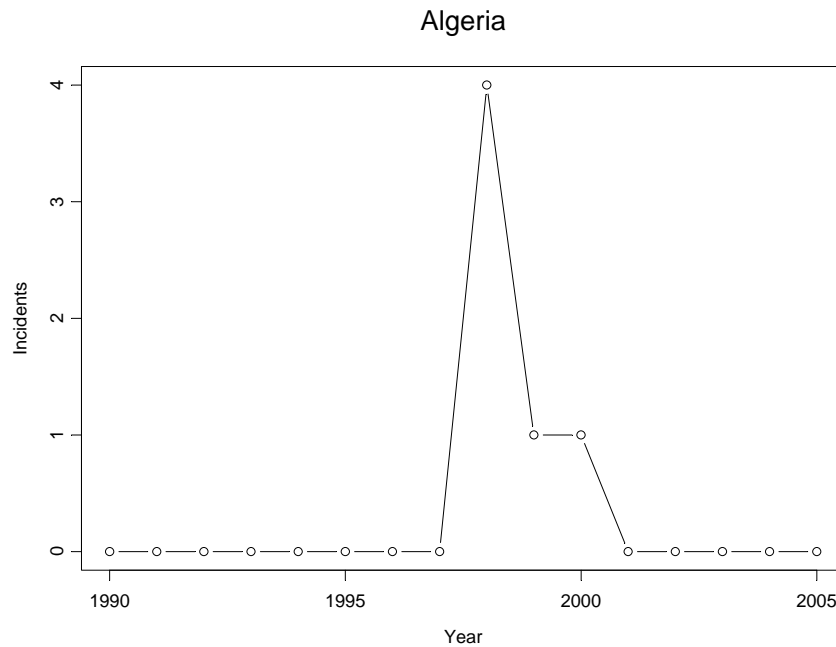


Figure 3. Number of oil and gas incidents, 1990 - 2005: Colombia

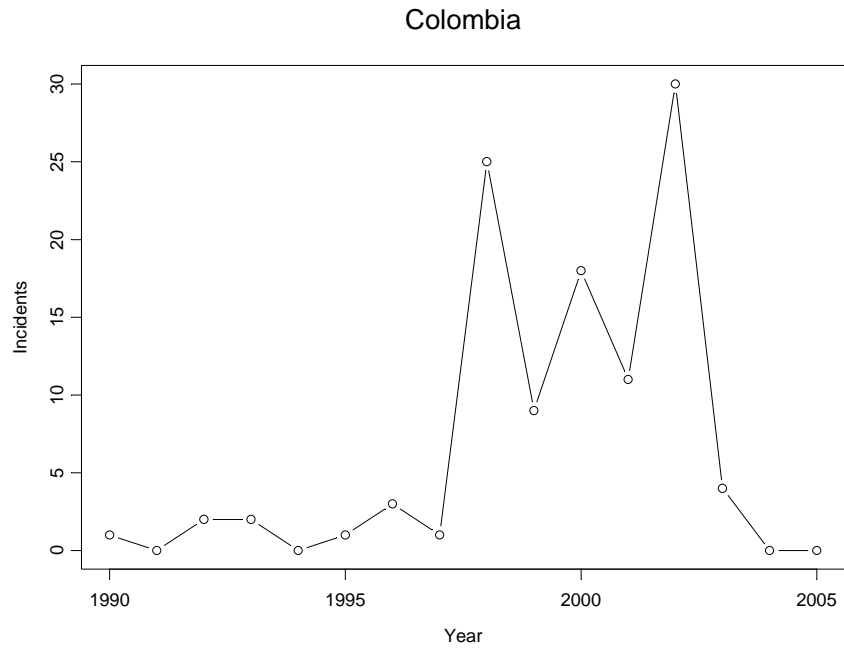


Figure 4. Number of oil and gas incidents, 1990 - 2005: Ecuador

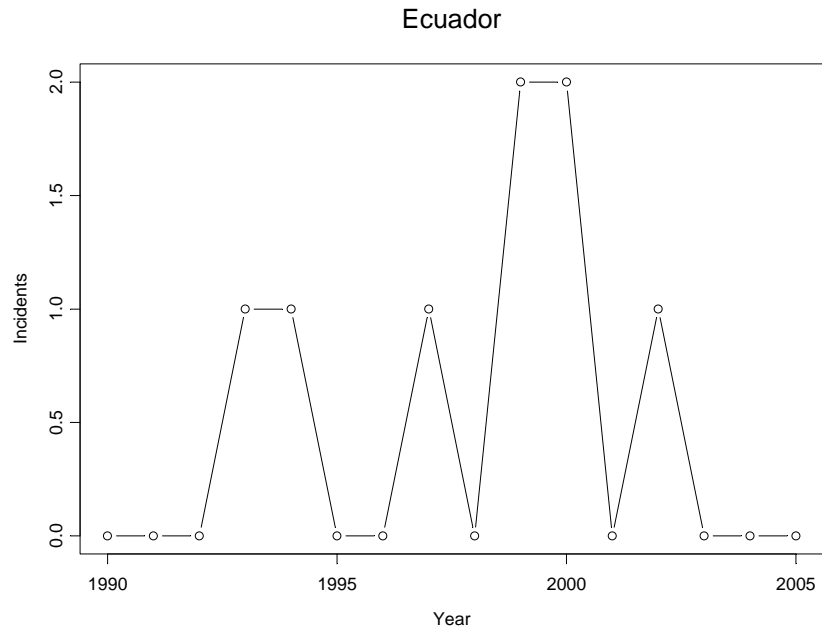


Figure 5. Number of oil and gas incidents, 1990 - 2005: Iraq

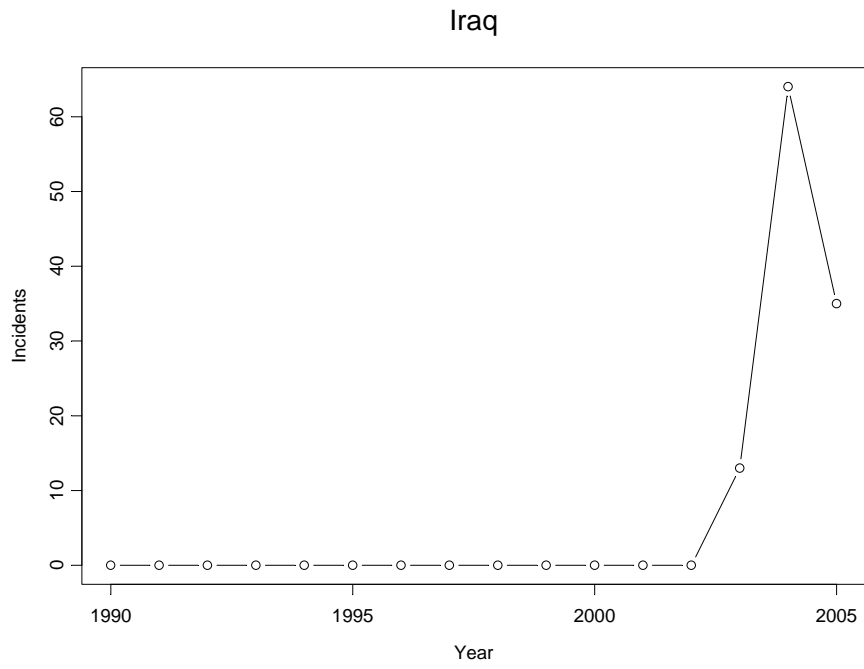


Figure 6. Number of oil and gas incidents, 1990 - 2005: Pakistan

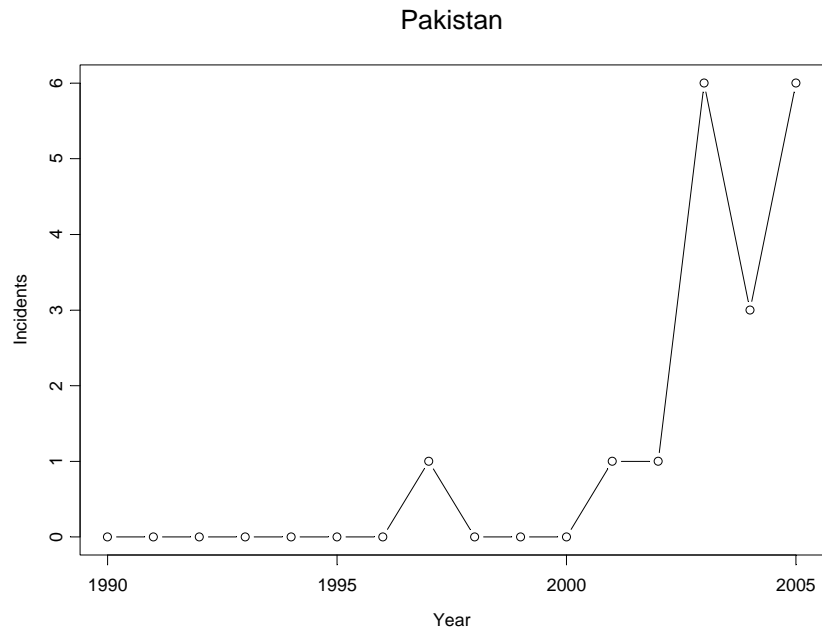


Figure 7. Number of oil and gas incidents, 1990 - 2005: Philippines

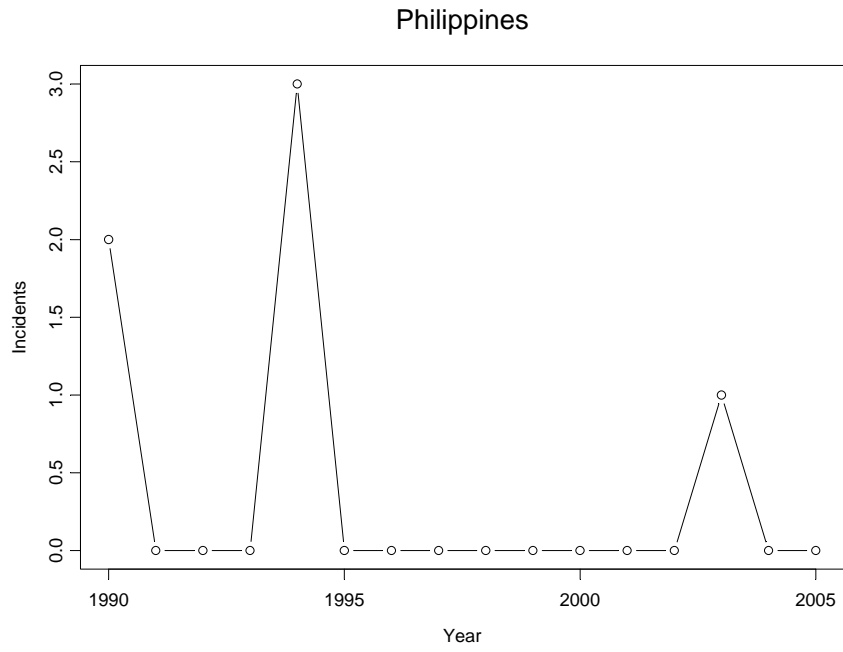


Figure 8. Number of oil and gas incidents, 1990 - 2005: Russia

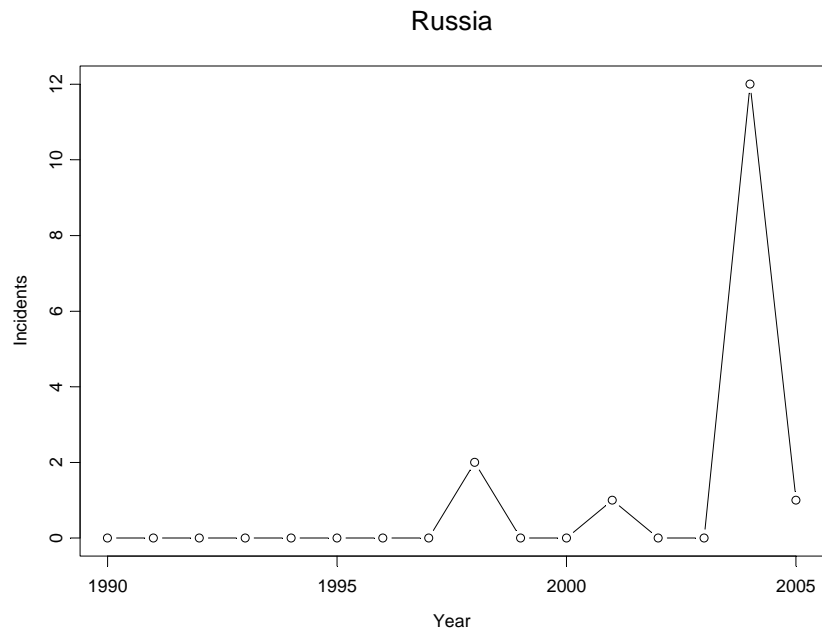


Figure 9. Number of oil and gas incidents, 1990 - 2005: Turkey

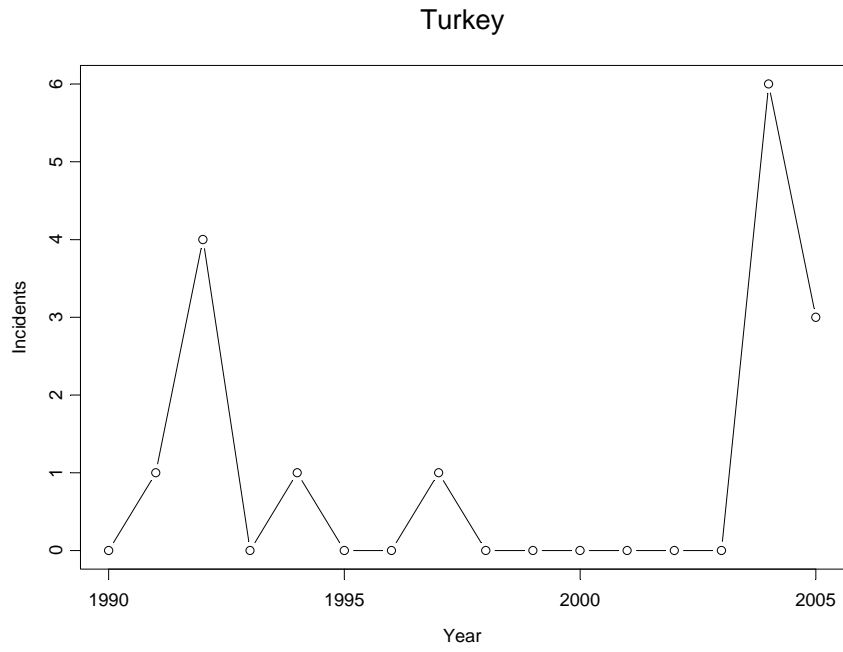
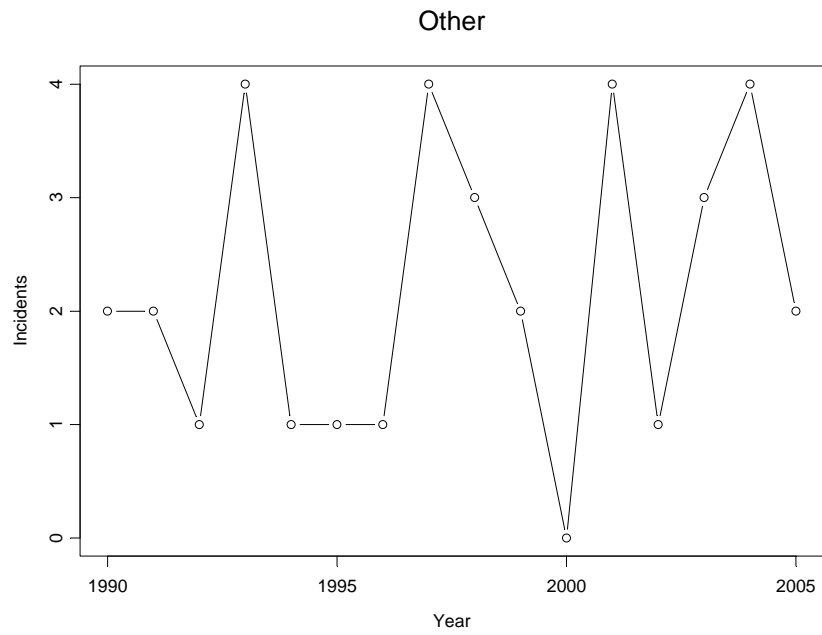
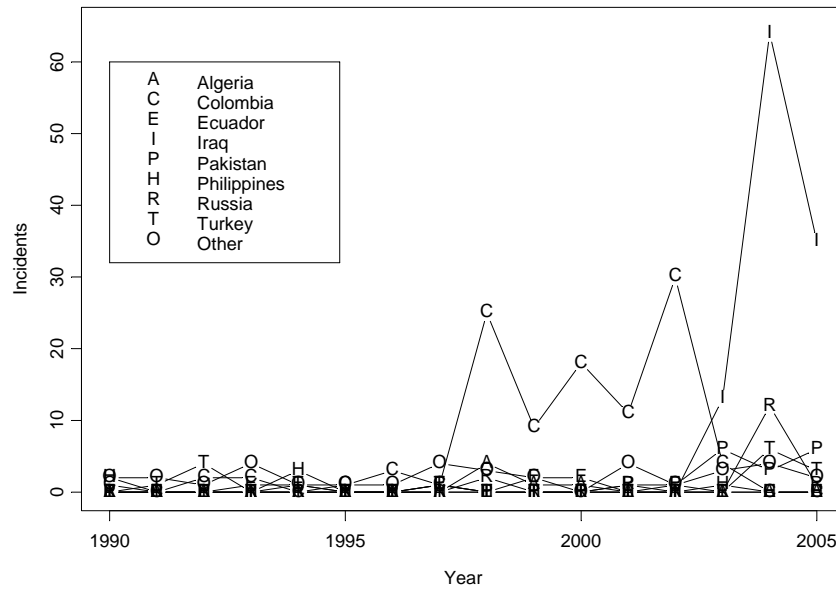


Figure 10. Number of oil and gas incidents, 1990 - 2005: Other



The plot shown below includes data from all the countries:

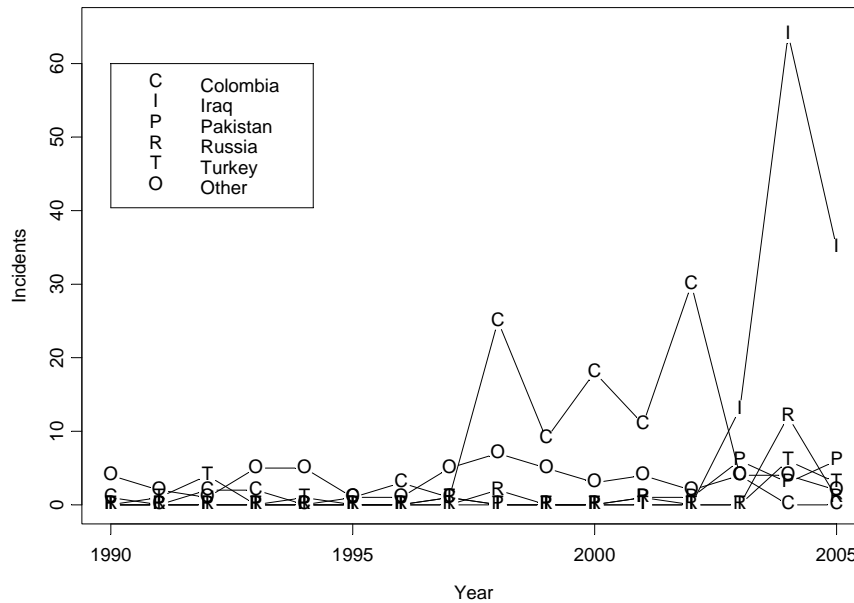
Figure 11. Number of oil and gas incidents, 1990 – 2005: All countries



There are some very interesting patterns in the data. Until 1997, attacks on oil/gas installations were relatively rare regardless of location. From 1998 through 2002 there was a big jump in incidents in Colombia, but the number dropped dramatically in 2003. At this same time attacks increased in Pakistan, Turkey, Russia, and especially Iraq. Clearly this is related to Islamic terrorism in each of these countries. Although the simultaneous drop in attacks in Colombia and increase in the four named countries is presumably a coincidence, it is an interesting pattern nevertheless.

The plot can be simplified by including Algeria, Ecuador, and the Philippines in the “Other” category. This is equivalent to defining “Other” to be countries with less than 5 incidents in every year. With this definition of “Other” the plot summarizing all the data for number of incidents is shown below.

Figure 12. Number of oil and gas incidents, 1990 – 2005: All countries (simplified)



The plot shows the three major patterns in the counts: Colombia from 1998 through 2002, Iraq in 2003 through 2005, and Russia, Turkey, and Pakistan increasing starting in 2003.

## 2.2 Incidents on the oil and gas sector as a percentage of total incidents

The next analysis is an evaluation of the trend in terrorist attacks against oil and gas facilities in the context of terrorist attacks in general, in order to explore the possibility that attacks on oil and gas were simply an outcome of terrorist activity in general. This analysis was also carried out at the geographic level of the country. The plots in the previous section focus on the overall likelihood of an attack in a particular country. The following plots show the percentages of terrorist incidents in each year for each country that were attacks on oil/gas installations (thus, they range from 0% to 100%). These plots thus speak to the “popularity” (for want of a better word) of oil/gas installations as targets. The percentages give an indication of whether terrorists are focusing more or less on oil/gas relative to other targets. For some countries and years there is no data, since that corresponds to countries where there were no terrorist incidents that year (these could have been plotted as zeroes, but that would have been misleading; it isn’t that oil/gas installations were not “popular” targets that year, rather, there were no targets at all, which is clearly not the same thing).

Figure 13. Oil and gas incidents as a percentage of total incidents, 1990 – 2005: Algeria

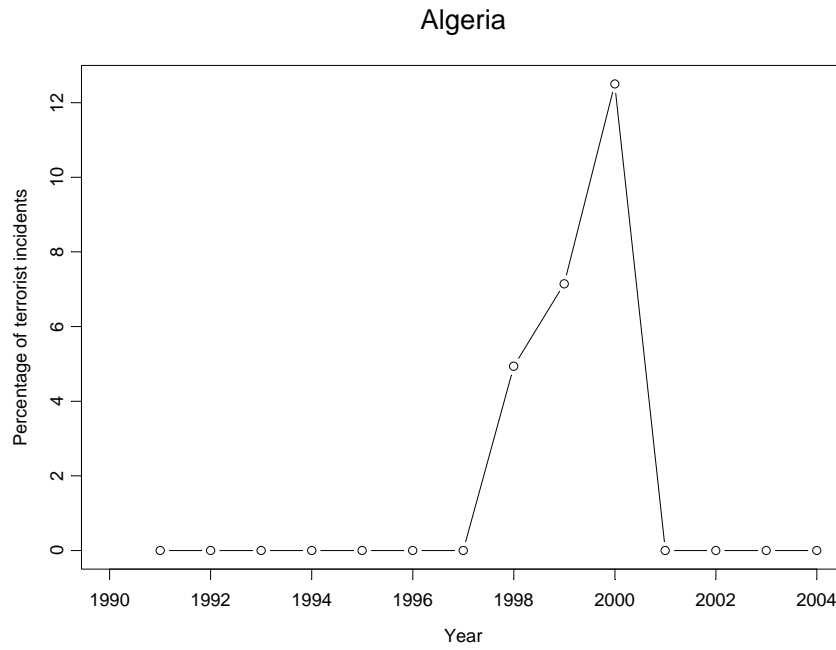


Figure 14. Oil and gas incidents as a percentage of total incidents, 1990 – 2005: Colombia

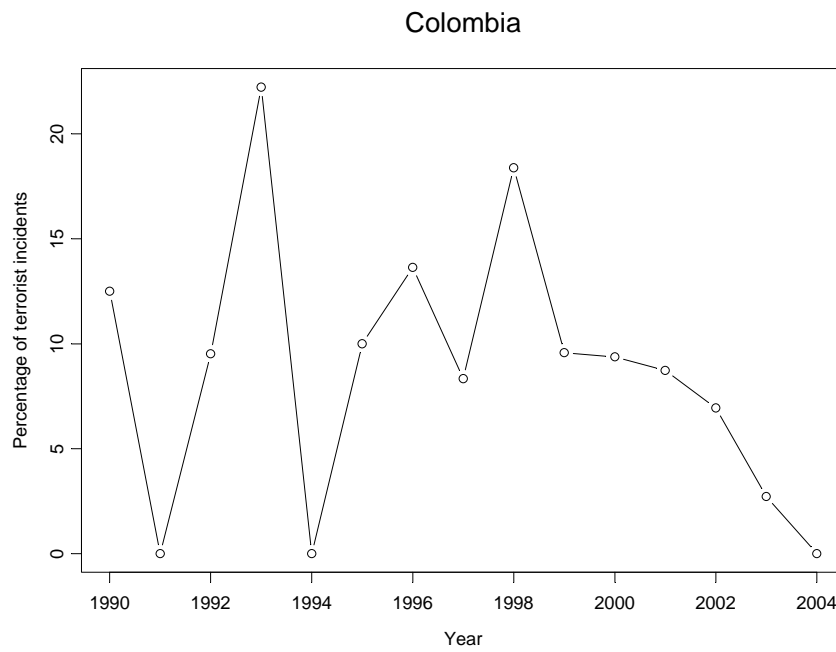


Figure 15. Oil and gas incidents as a percentage of total incidents, 1990 – 2005: Ecuador

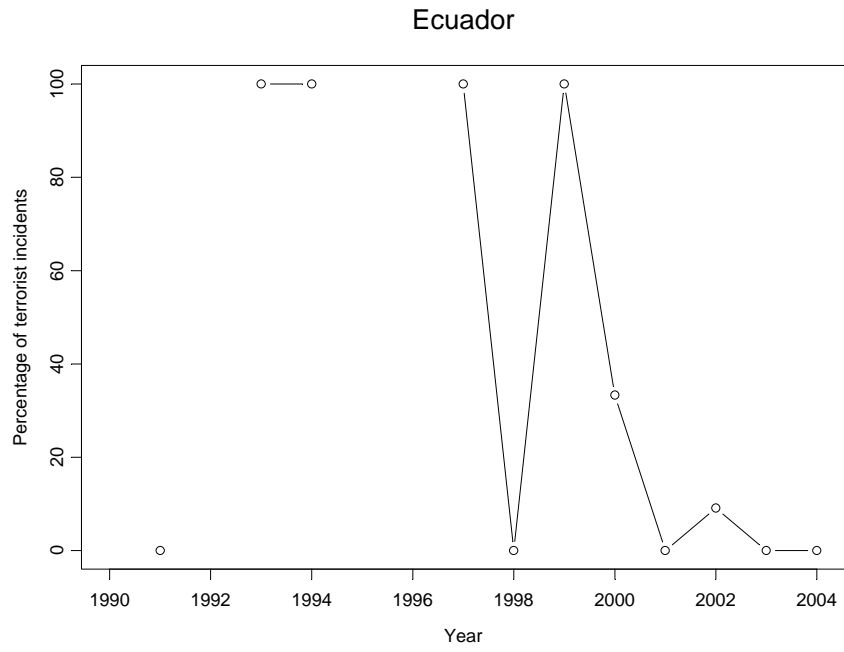


Figure 16. Oil and gas incidents as a percentage of total incidents, 1990 – 2005: Iraq

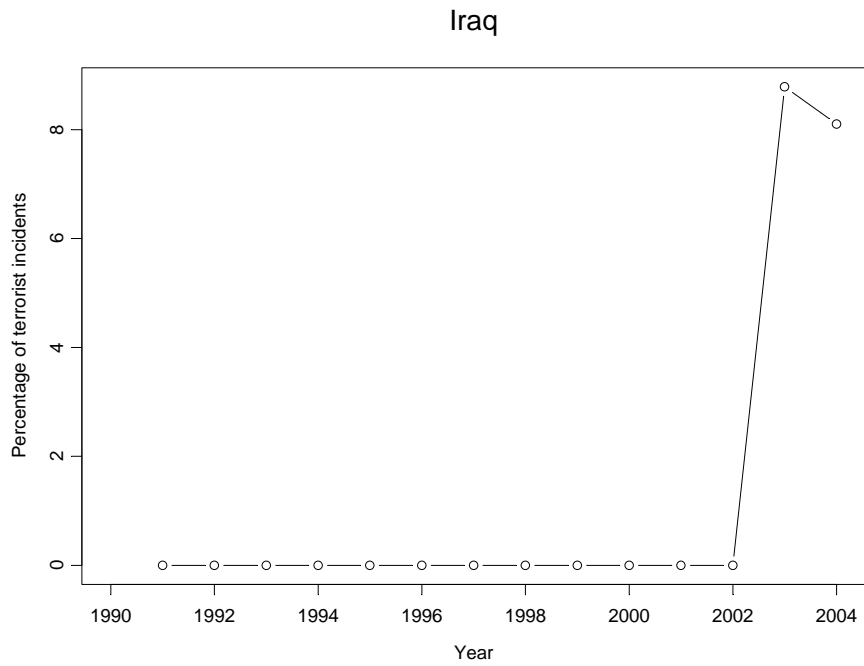


Figure 17. Oil and gas incidents as a percentage of total incidents, 1990 – 2005: Pakistan

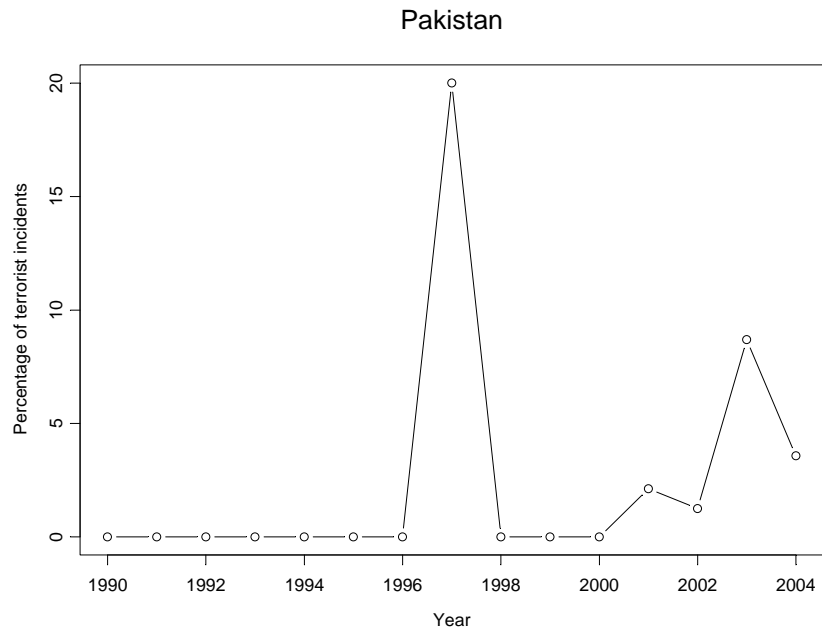


Figure 18. Oil and gas incidents as a percentage of total incidents, 1990 – 2005: Philippines

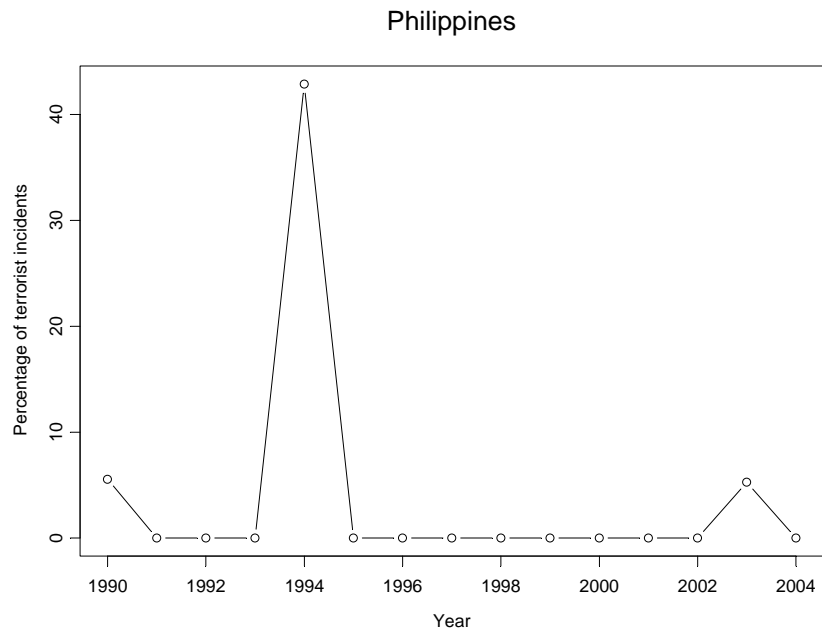


Figure 19. Oil and gas incidents as a percentage of total incidents, 1990 – 2005: Russia

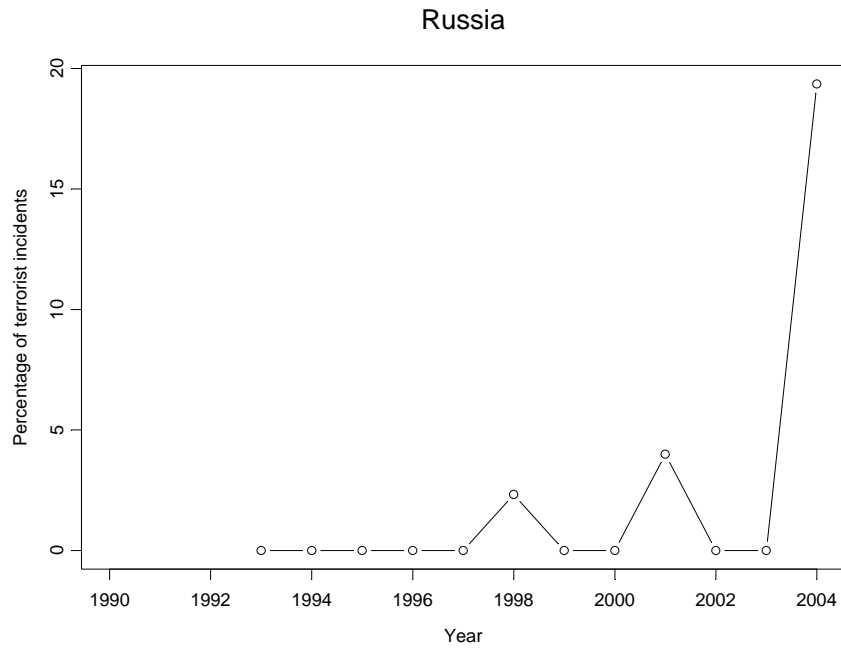


Figure 20. Oil and gas incidents as a percentage of total incidents, 1990 – 2005: Turkey

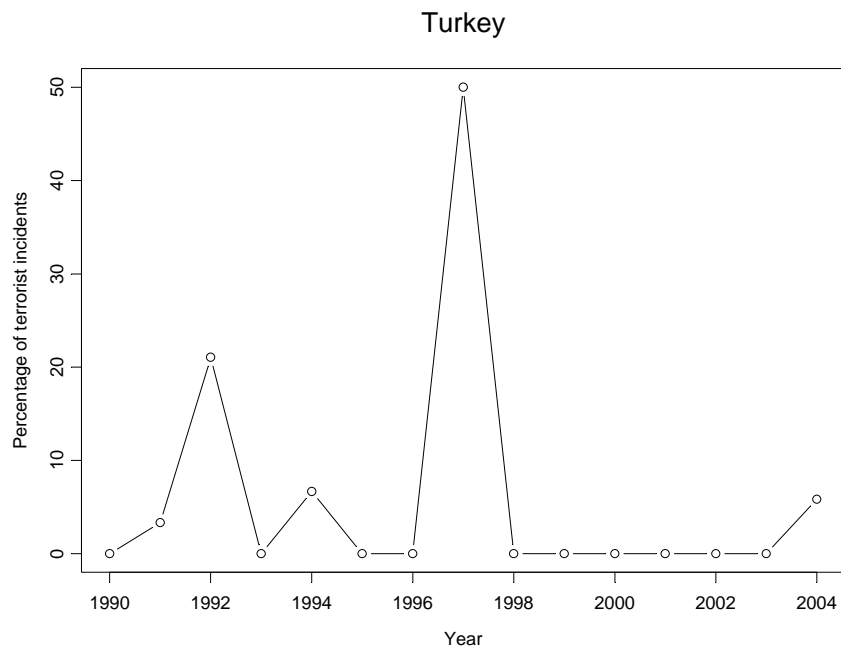


Figure 21. Oil and gas incidents as a percentage of total incidents, 1990 – 2005: Other

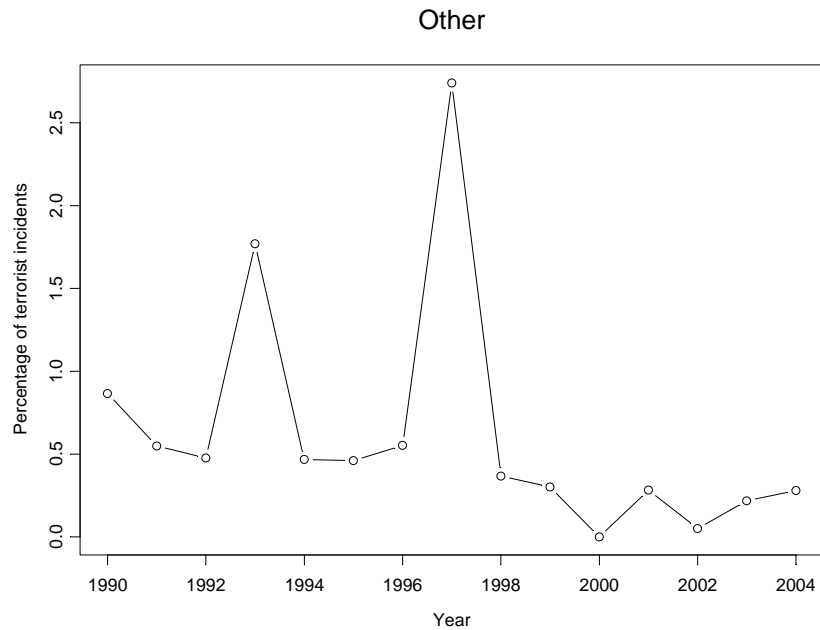
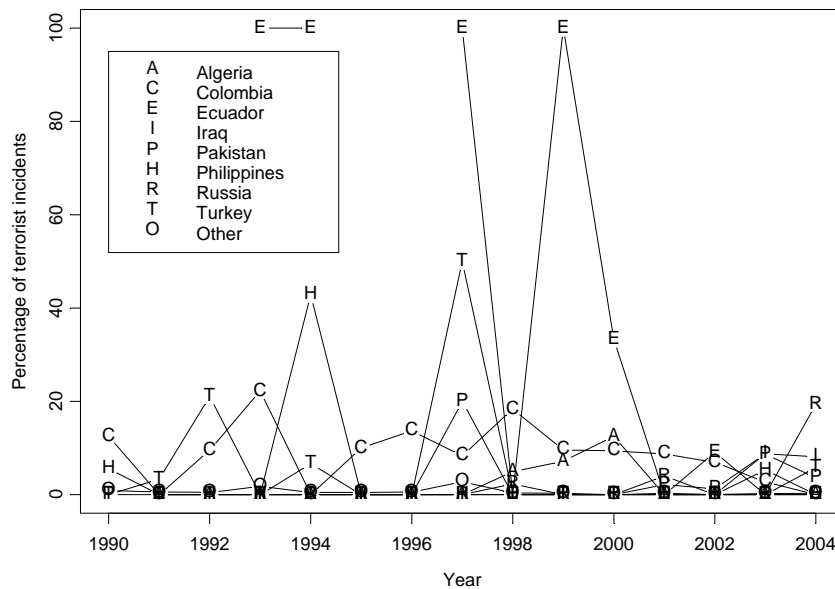


Figure 22. Oil and gas incidents as a percentage of total incidents, 1990 – 2005: All Countries



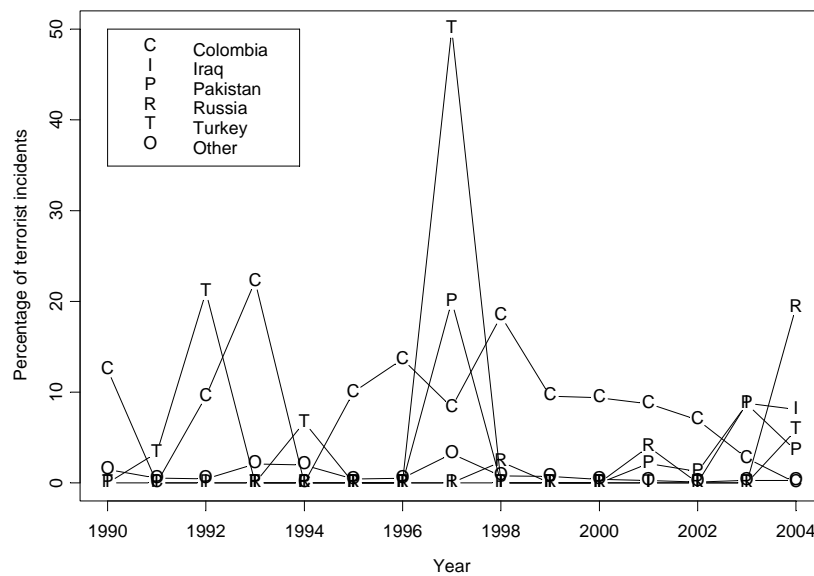
The data indicate that in general the importance of oil and gas installations around the world relative to other potential targets is not that high. Other than in 1997, the annual percentage of terrorist incidents that are aimed at oil/gas installations is less than 1%. There have only been one or two oil/gas attacks in Ecuador in any year (when there are any), but this is often all of the terrorist activity in the country that year. The occasional oil/gas attack in Turkey prior to 1998 was often an appreciable percentage of the total terrorist activity, but since 1998 it has been a small percentage of that activity. The popularity of oil/gas installations in

Colombia peaked in 1998, and has been declining steadily since then, even though the raw counts of incidents continued to be high through 2000. This implies that the rate of attacks on other targets increased in 1999 and 2000. Oil and gas installations were relatively popular targets in Algeria from 1998 through 2000, but after that attacks stopped (indeed, these are the only years with any attacks on oil/gas installations in that country). Oil/gas attacks exhibit an increasing popularity in the last 3-5 years in Iraq, Pakistan, and Russia.

The last plot can be simplified by including some countries in the “Other” category as was done in the previous section. This makes it easier to see the data in the plot, which is shown below.

Here is the corresponding plot for incidents as a percentage of the number of incidents in that country in that year.

Figure 23. Oil and gas incidents as a percentage of total incidents, 1990 – 2005: All countries (simplified)



As noted above, the popularity of oil/gas installations in Colombia peaked in 1998, and has been declining steadily since then, and oil/gas attacks exhibit an increasing popularity in the last 3-5 years in Iraq, Pakistan, and Russia.

### 2.3 Incidents by region

Another important way to look at these data to supplement the breakdown by country is by region. The plots shown below summarize the regional data.

Figure 24. Oil and gas incidents by region, 1990 – 2005: Africa

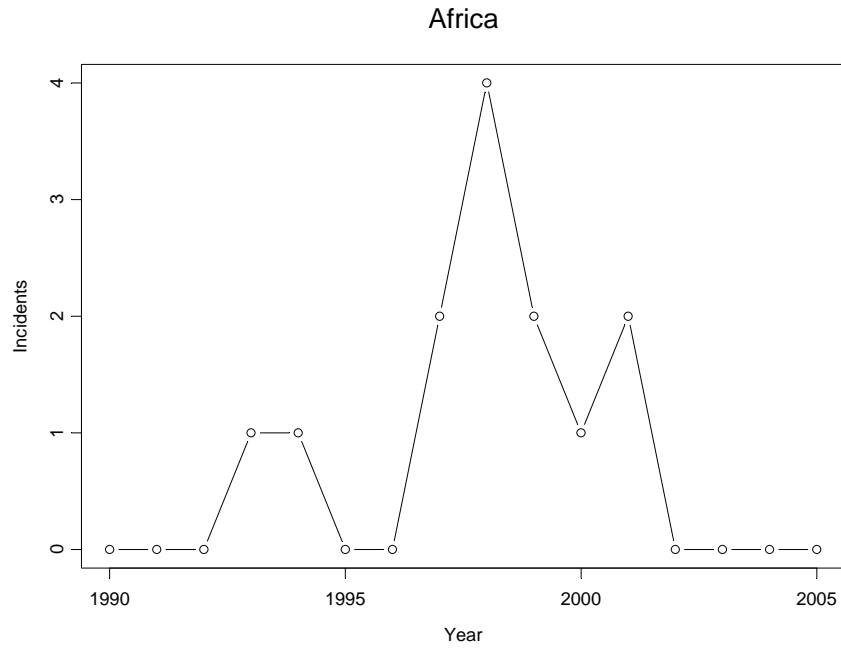


Figure 25. Oil and gas incidents by region, 1990 – 2005: East and Central Asia

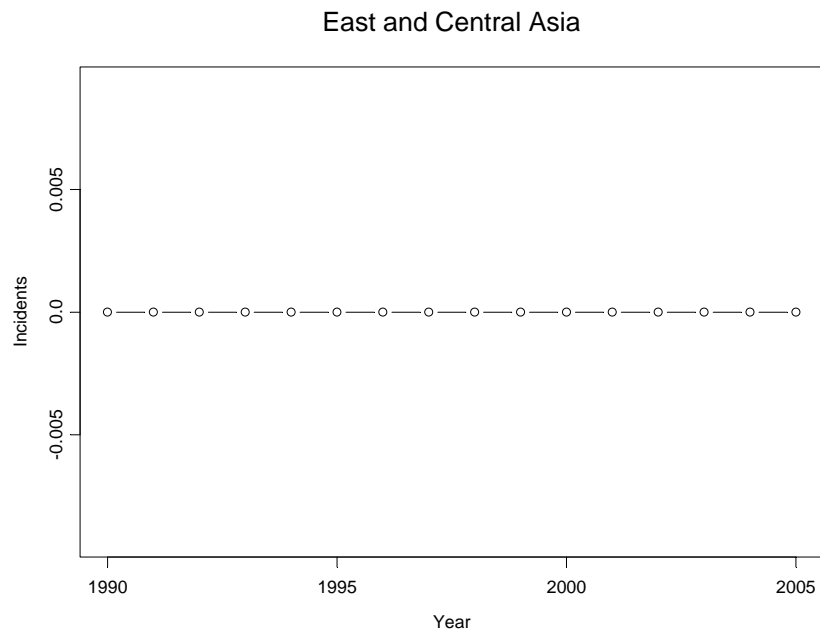


Figure 26. Oil and gas incidents by region, 1990 – 2005: Eastern Europe

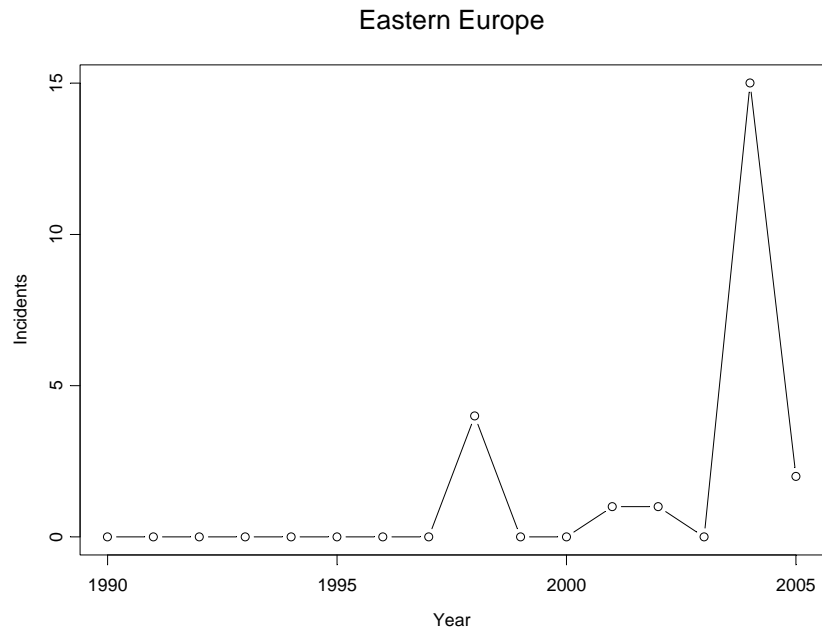


Figure 27. Oil and gas incidents by region, 1990 – 2005: Latin America

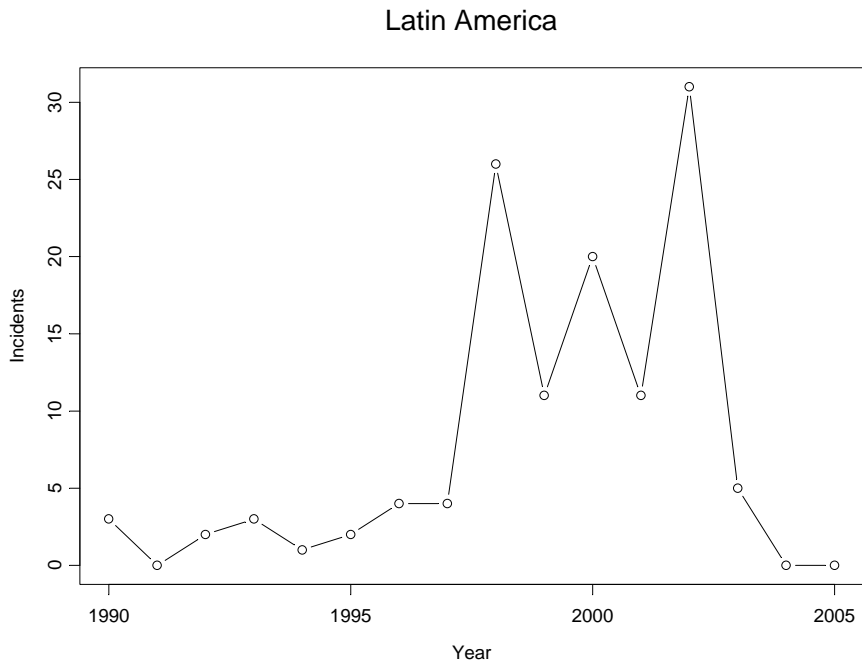


Figure 28. Oil and gas incidents by region, 1990 – 2005: Middle East / Persian Gulf

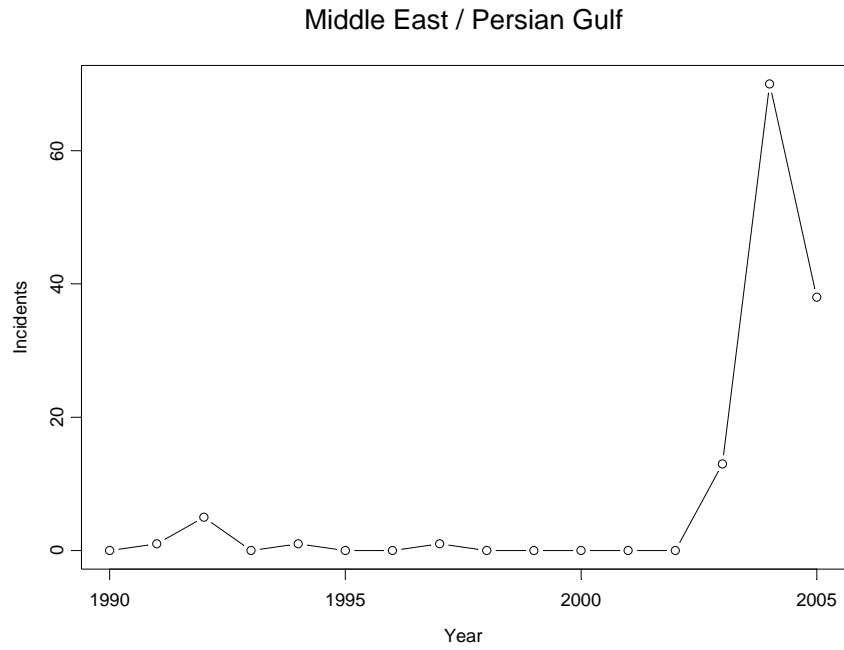


Figure 29. Oil and gas incidents by region, 1990 – 2005: North America

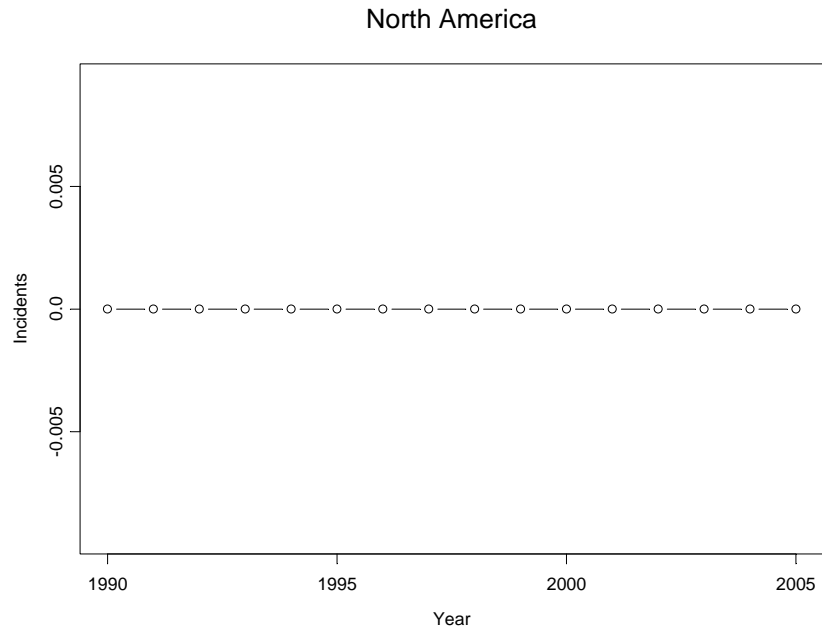


Figure 30. Oil and gas incidents by region, 1990 – 2005: South Asia

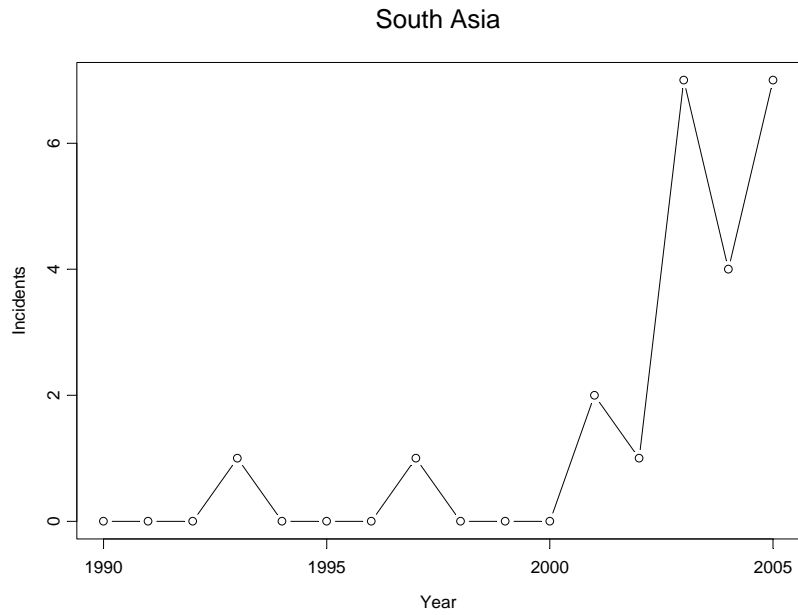


Figure 31. Oil and gas incidents by region, 1990 – 2005: Southeast Asia and Oceania

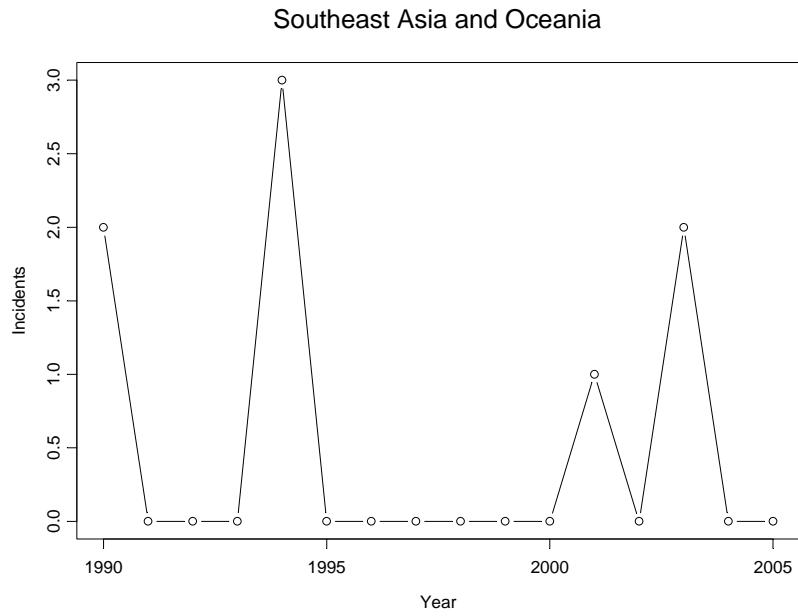


Figure 32. Oil and gas incidents by region, 1990 – 2005: Western Europe

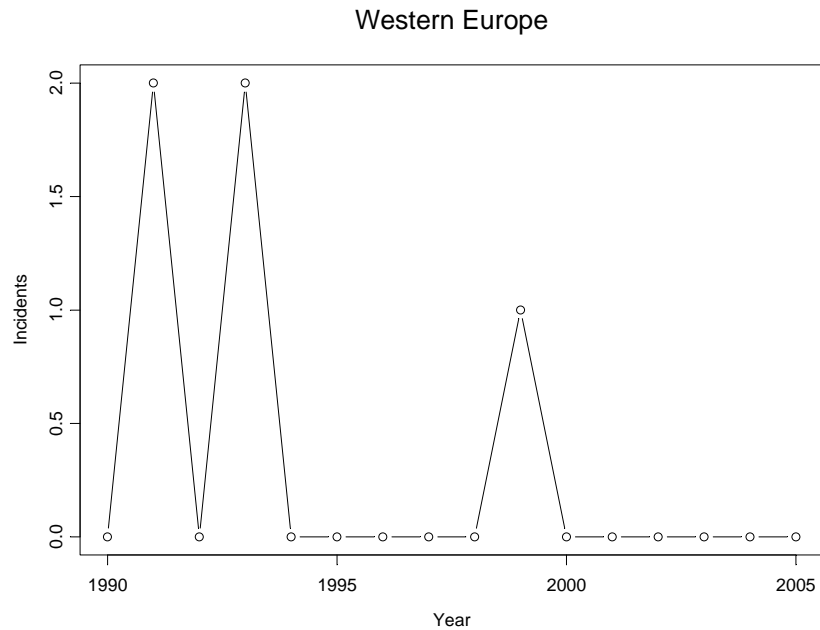
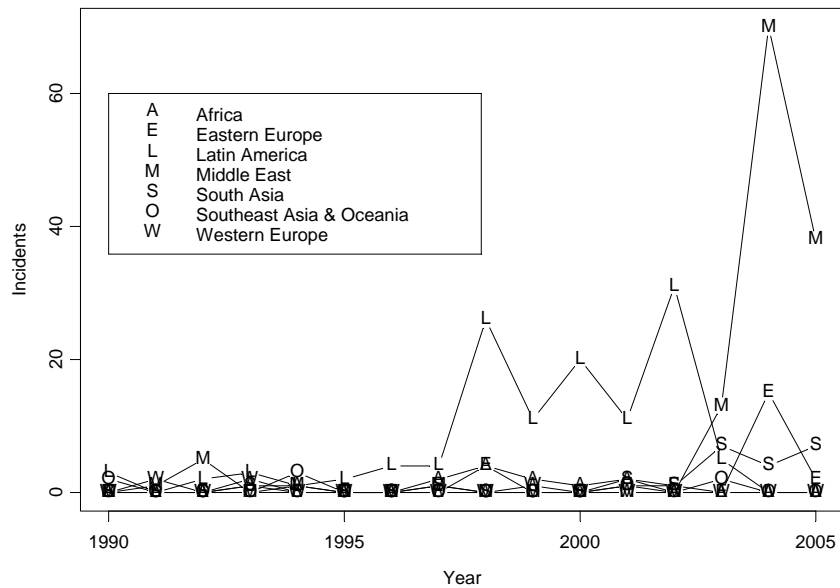


Figure 33. Oil and gas incidents by region, 1990 – 2005: All regions



There have been no oil/gas attacks in East and Central Asia or North America. The pattern for Latin America is driven mostly by Colombia, while that for the Middle East comes from Iraq. The data also show recent increases in attacks in South Asia (Pakistan) and Eastern Europe (Russia). Overall, breaking the data out by regions isn't really useful, since the regions are each actually representing only one country. Hence this kind of analysis will not be carried out in the next sections on fatalities and injuries.

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## SECTION 3: FATALITIES

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Over the period 1990-2005 there were 150 deaths associated with terrorist attacks on the oil and gas sector recorded in the MIPT database.

### 3.1 Number of fatalities

The plots below show the number of fatalities related to oil/gas terrorist acts for the eight countries (plus other). In all of the plots, years where there were no incidents are not plotted (although fatalities would obviously be zero in such years).

Figure 34. Fatalities related to oil and gas incidents, 1990 – 2005: Algeria

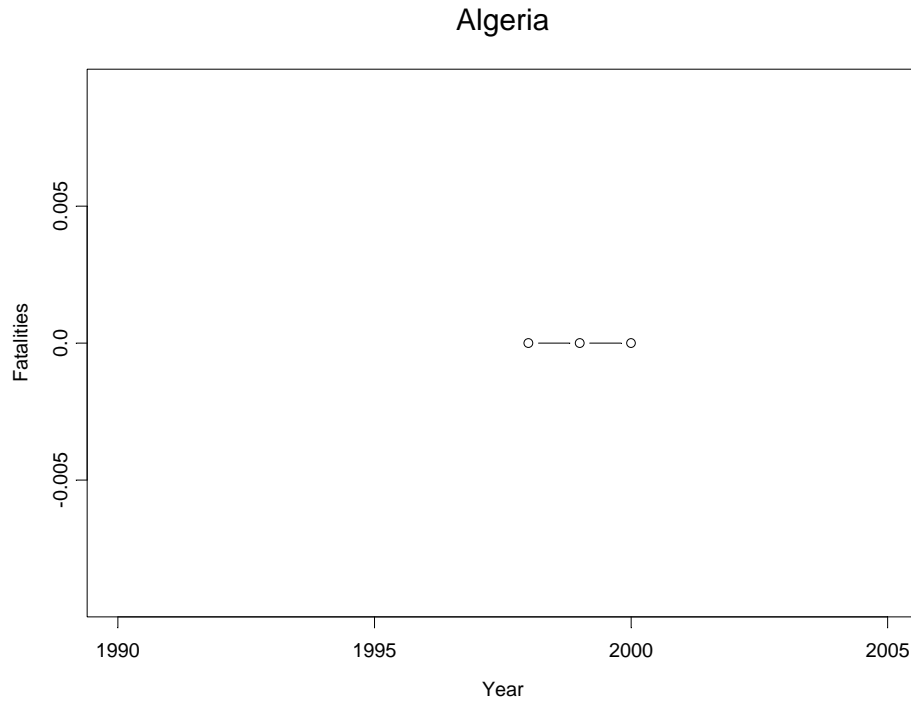


Figure 35. Fatalities related to oil and gas incidents, 1990 – 2005: Colombia

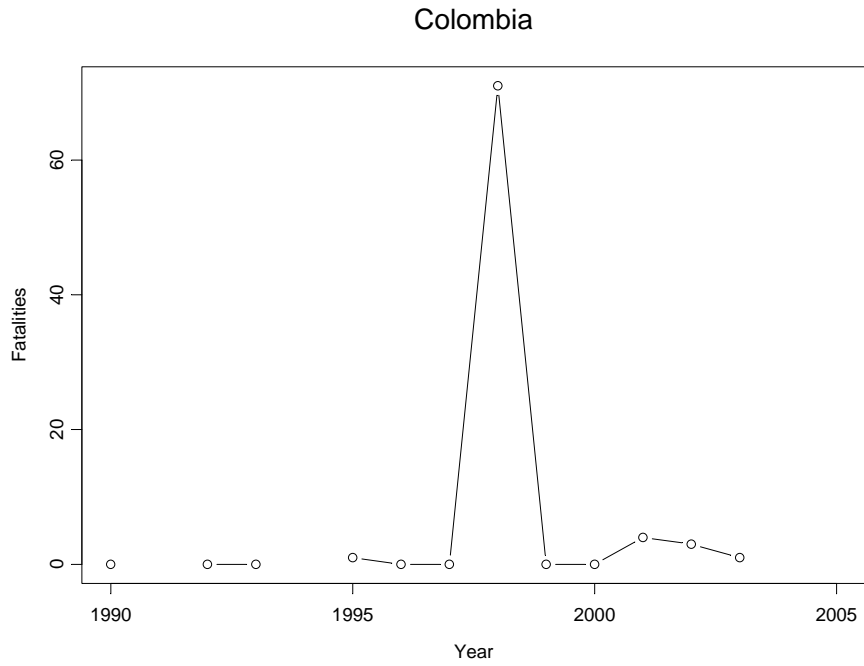


Figure 36. Fatalities related to oil and gas incidents, 1990 – 2005: Ecuador

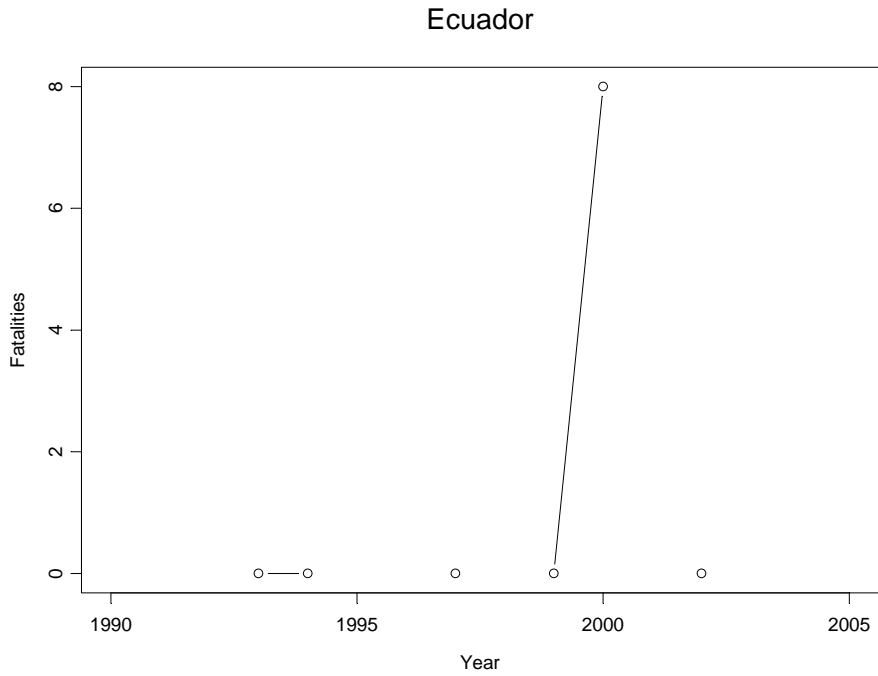


Figure 37. Fatalities related to oil and gas incidents, 1990 – 2005: Iraq

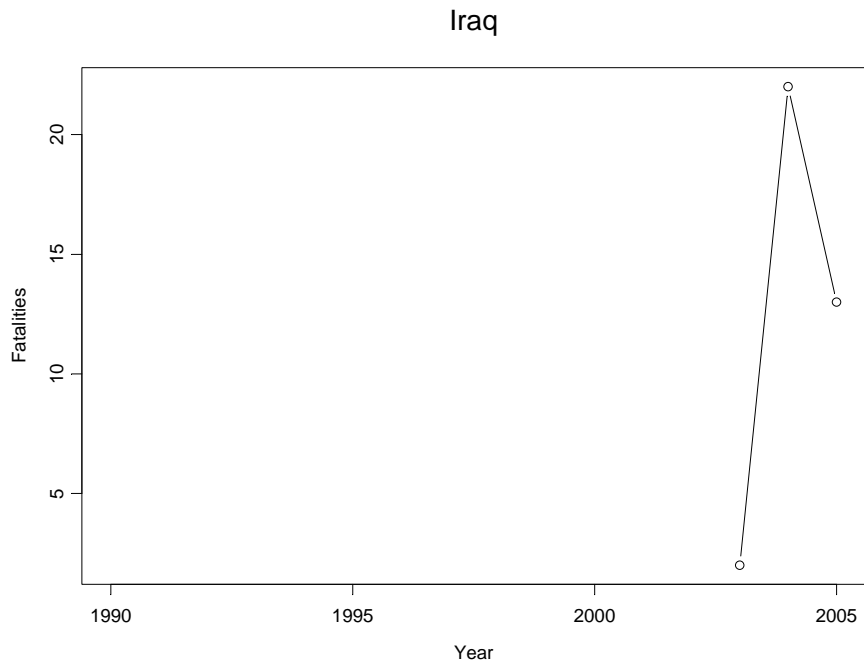


Figure 38. Fatalities related to oil and gas incidents, 1990 – 2005: Pakistan

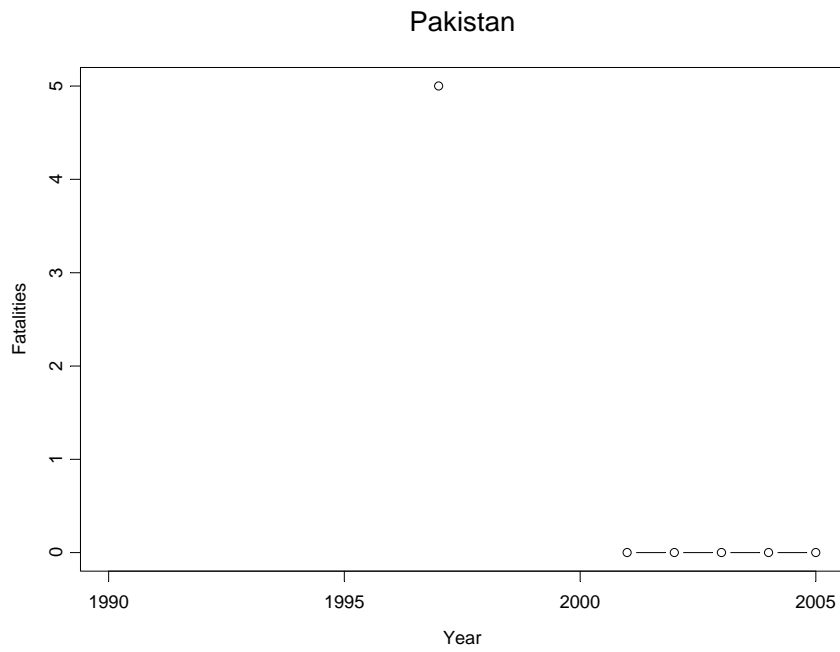


Figure 39. Fatalities related to oil and gas incidents, 1990 – 2005: Philippines

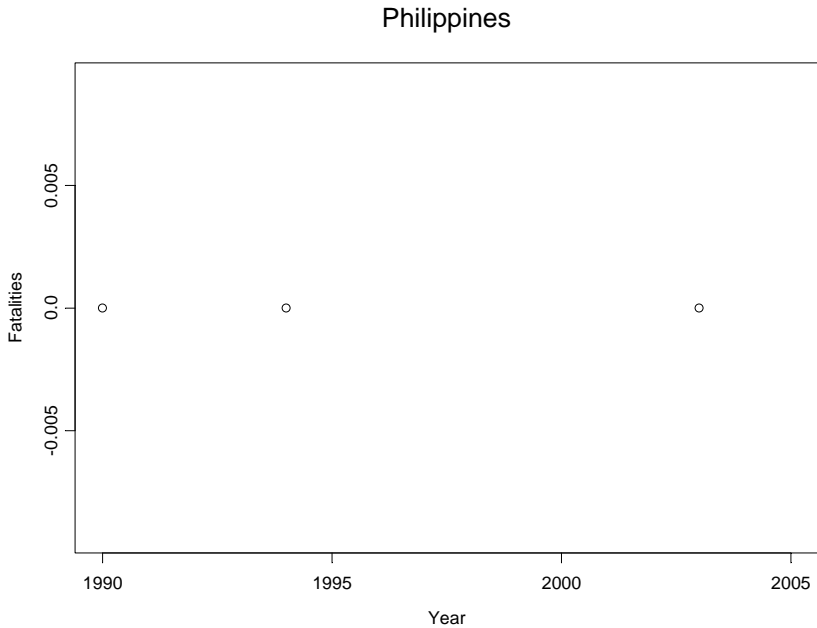


Figure 40: Fatalities related to oil and gas incidents, 1990 – 2005: Pakistan

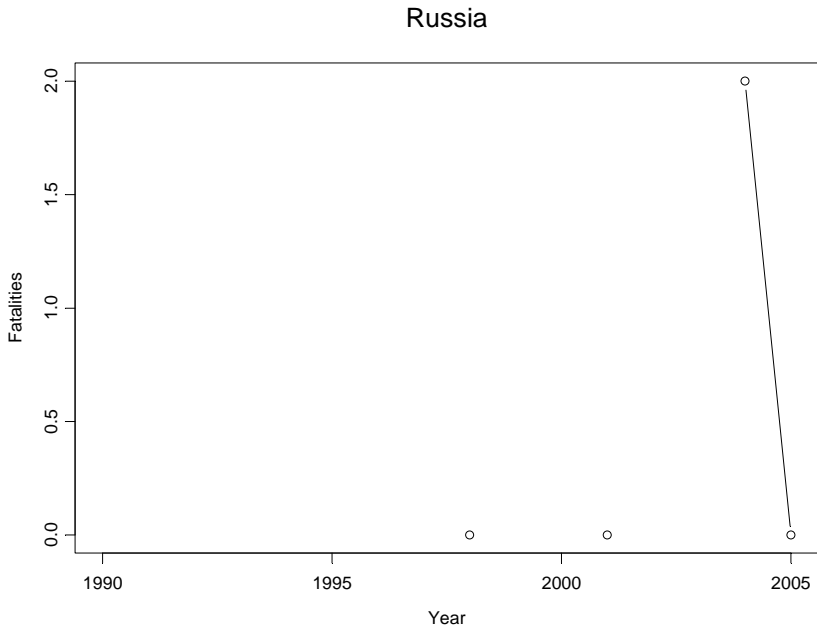


Figure 41. Fatalities related to oil and gas incidents, 1990 – 2005: Turkey

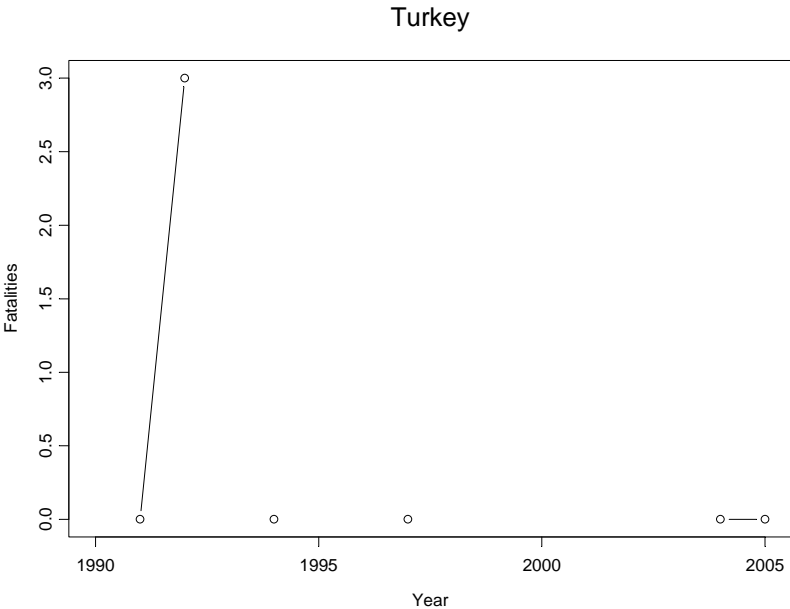
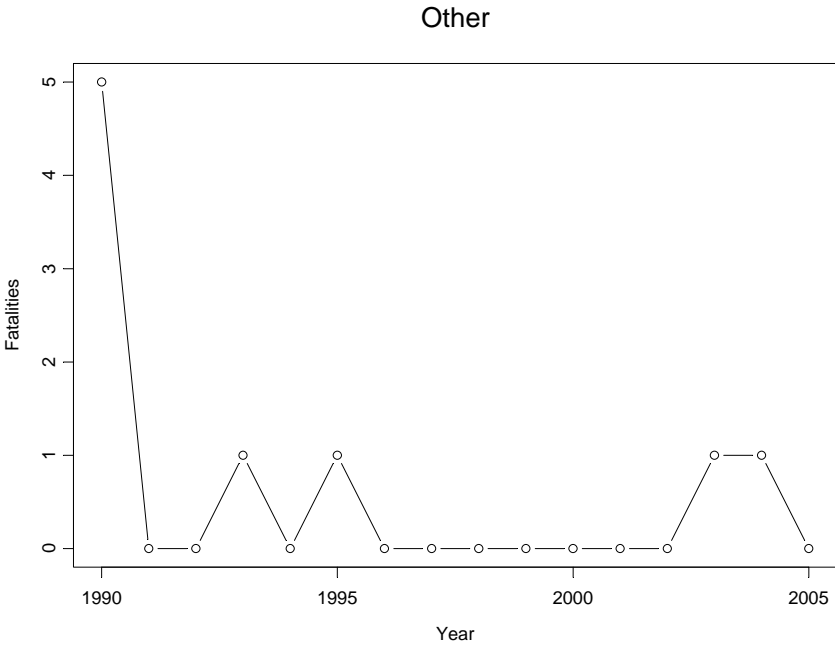
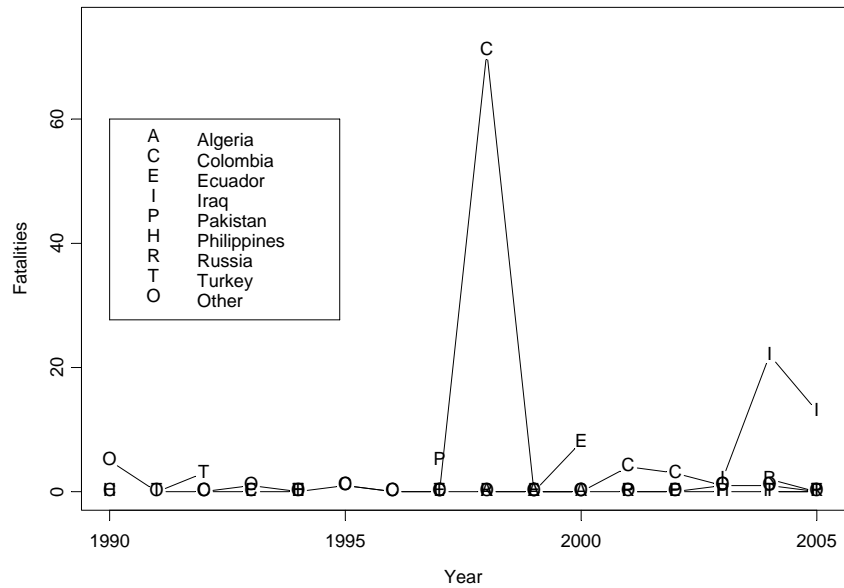


Figure 42. Fatalities related to oil and gas incidents, 1990 – 2005: Other



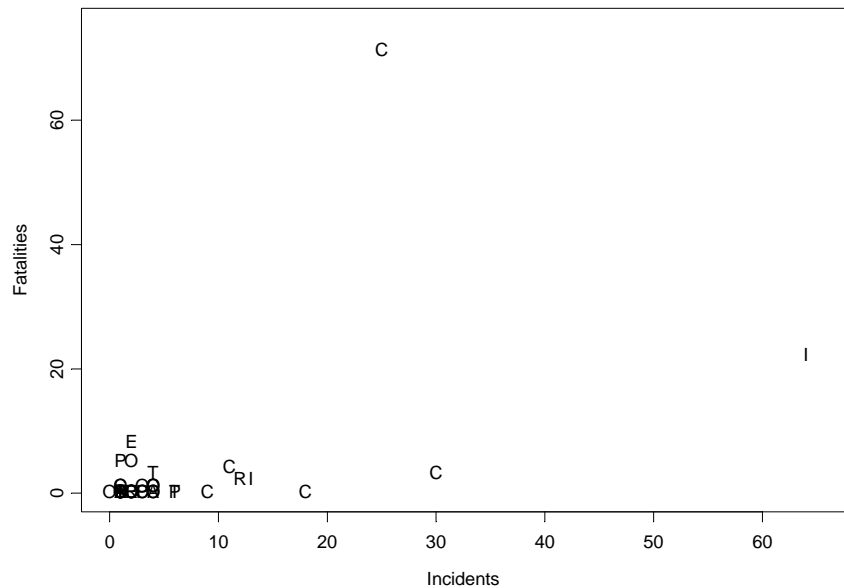
Fatalities related to oil/gas terrorist activity are relatively rare, with more than five deaths occurring in a single country only in Colombia in 1998 (71 deaths), Ecuador in 2000 (8 deaths), and Iraq in 2004 (22 deaths) and 2005 (13 deaths). The plot below shows all of the country data:

Figure 43. Fatalities related to oil and gas incidents, 1990 – 2005: All countries



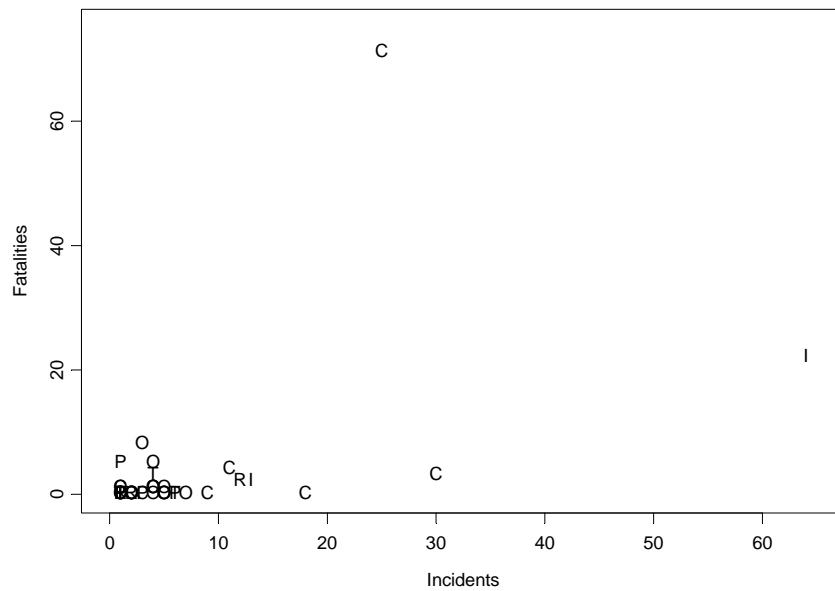
As expected, there is a relationship between the number of fatalities from oil/gas attacks in a country and the number of oil/gas attacks (assuming that that number is greater than zero). However, the correlation is only about .52. As the graph below shows, that is being affected to a large extent by the unusual Colombia and Iraq data points.

Figure 44. Number of fatalities related to oil and gas incidents, 1990 – 2005



The last plot of the number of fatalities versus the number of incidents can be simplified by including some of the countries with relatively low numbers of incidents in the “Other” category. The plot is shown below.

Figure 45. Number of fatalities related to oil and gas incidents, 1990 – 2005 (simplified)



As was noted earlier, there really isn't anything very notable here, other than the unusual observations corresponding to Colombia in 1998 and Iraq in 2004 (the correlation between these two variables is .5, but it is only .22 if those two country/years are omitted).

### 3.2 Fatalities in oil and gas attacks as a percentage of all terrorist-related fatalities

The following plots show oil/gas terrorist attack deaths as a percentage of all terrorist-related deaths in that country that year, and thus speak to the relative seriousness of oil/gas attacks in terms of human life. There is one subtle definitional issue here – in years with terrorist attacks that led to no loss of life, the proportion of deaths from oil/gas attacks is not defined (it is 0/0), and that year does not appear in the plot.

Figure 46. Percentage of terrorist-related fatalities from oil and gas incidents, 1990 – 2005: Algeria

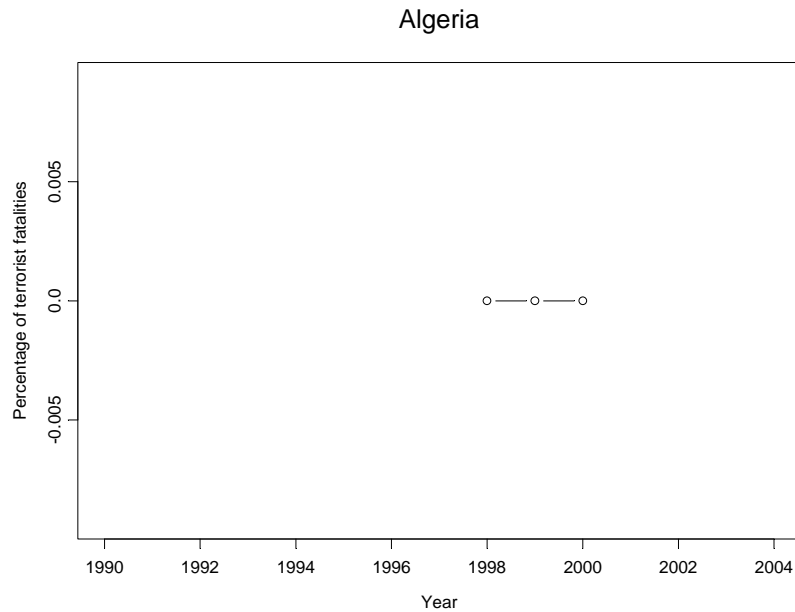


Figure 47. Percentage of terrorist-related fatalities from oil and gas incidents, 1990 – 2005: Colombia

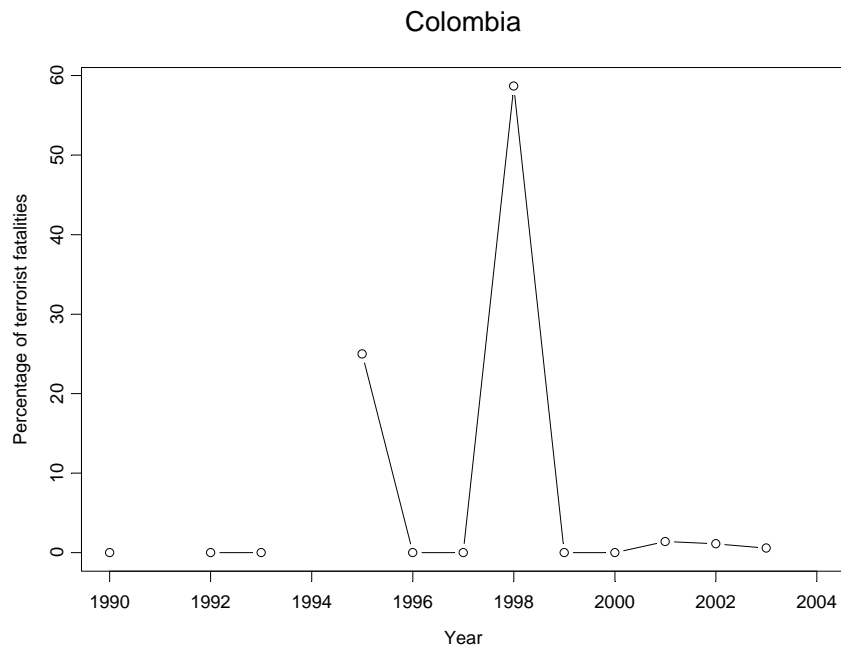


Figure 48. Percentage of terrorist-related fatalities from oil and gas incidents, 1990 – 2005: Ecuador

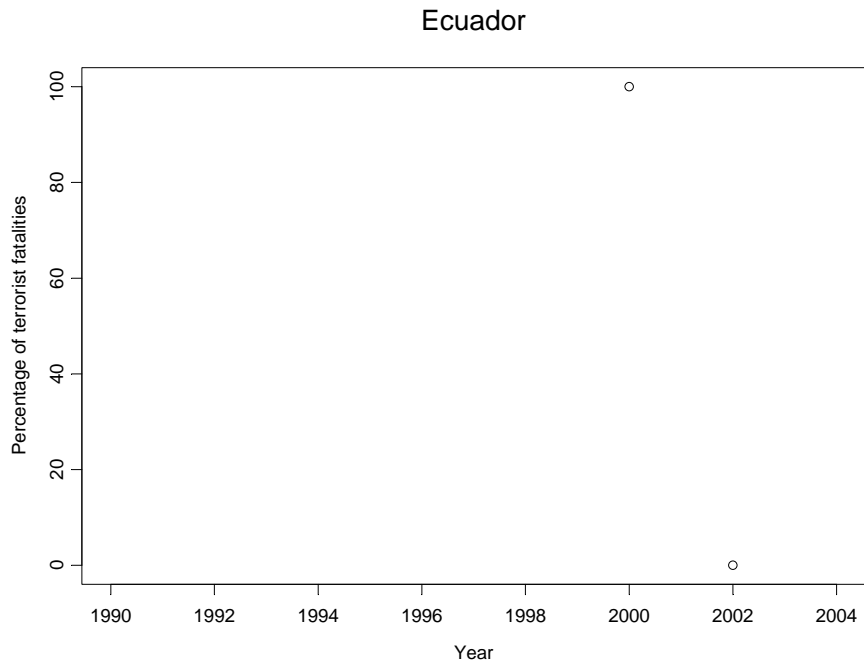


Figure 49. Percentage of terrorist-related fatalities from oil and gas incidents, 1990 – 2005: Iraq

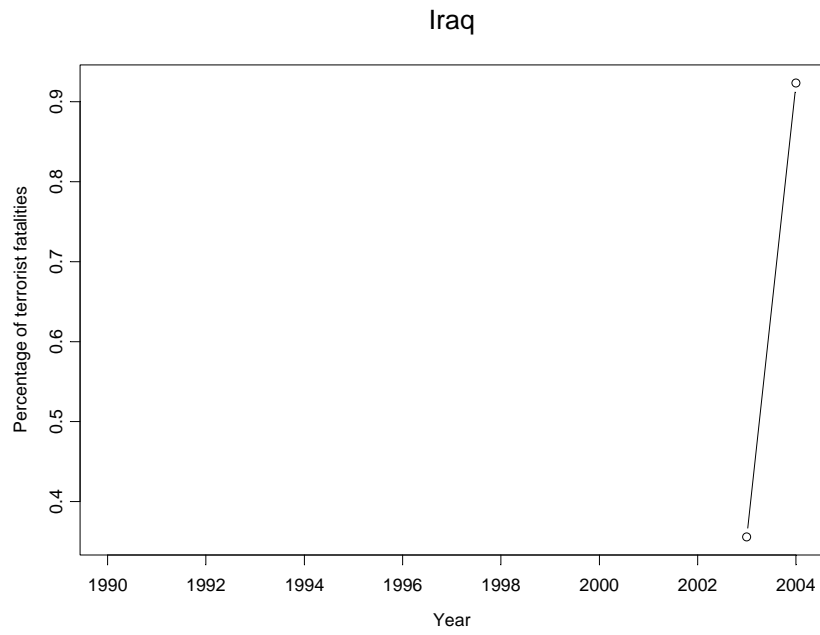


Figure 50. Percentage of terrorist-related fatalities from oil and gas incidents, 1990 – 2005: Pakistan

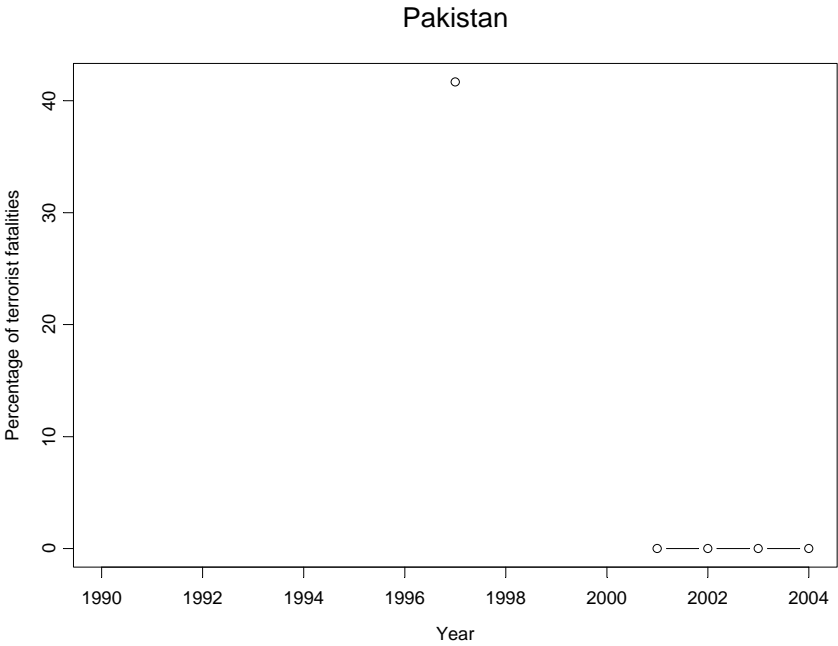


Figure 51. Percentage of terrorist-related fatalities from oil and gas incidents, 1990 – 2005: Philippines

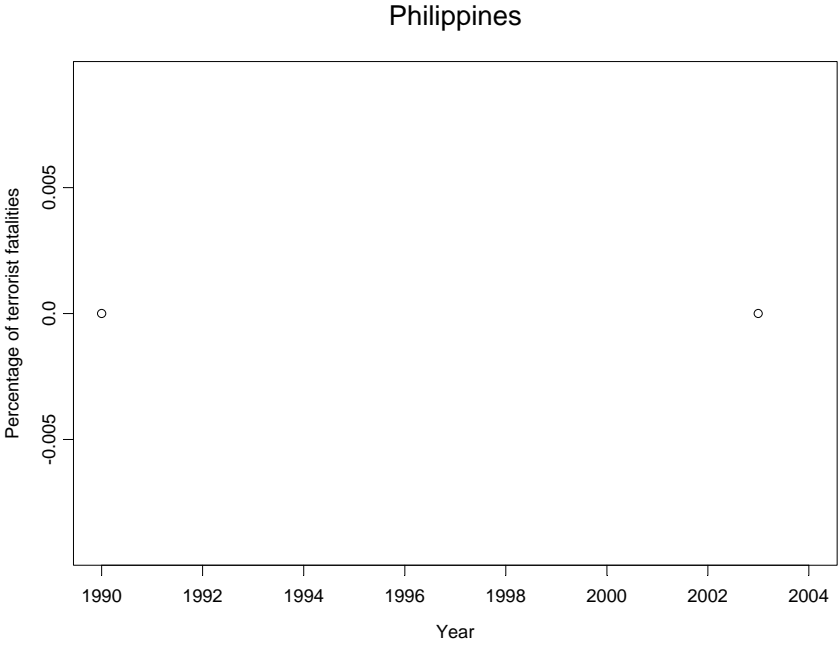


Figure 52. Percentage of terrorist-related fatalities from oil and gas incidents, 1990 – 2005: Russia

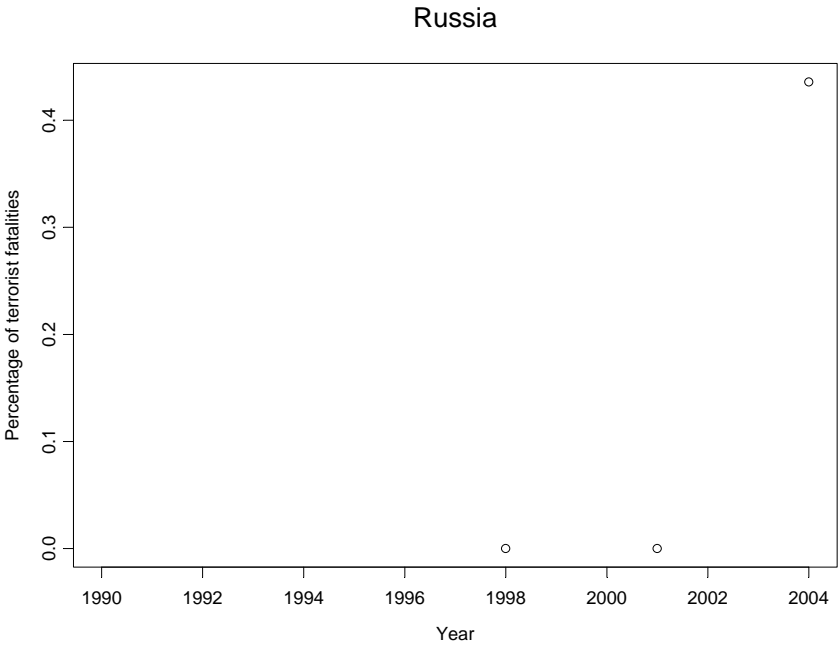


Figure 53. Percentage of terrorist-related fatalities from oil and gas incidents, 1990 – 2005: Turkey

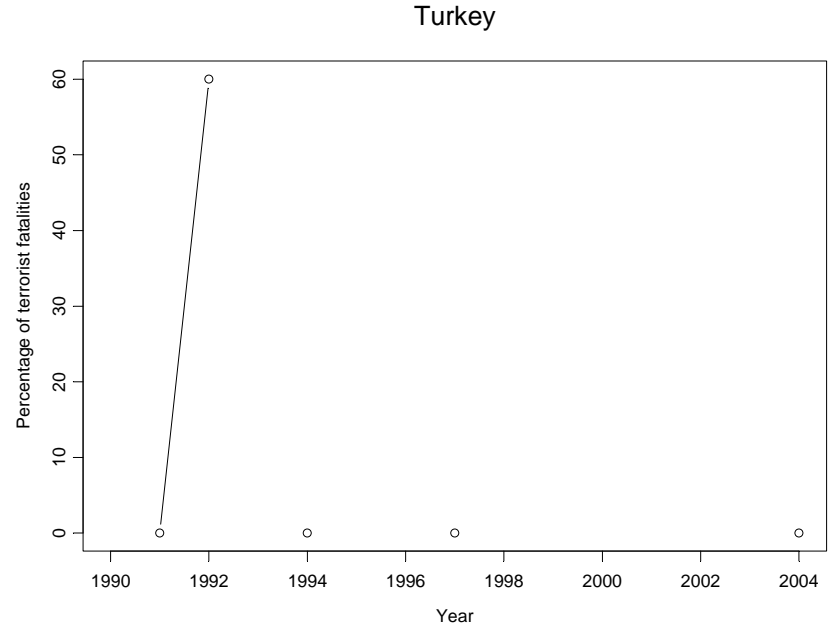


Figure 54. Percentage of terrorist-related fatalities from oil and gas incidents, 1990 – 2005: Other

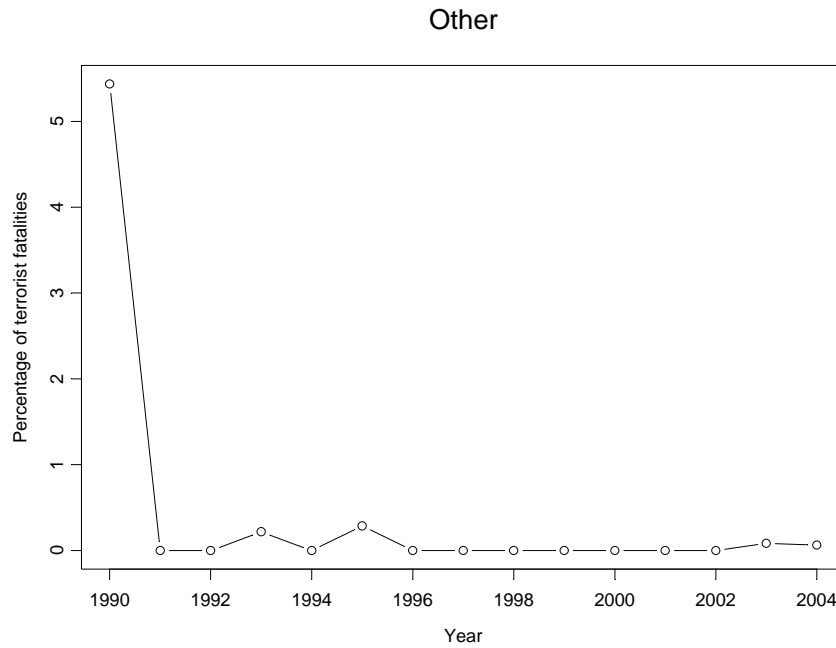
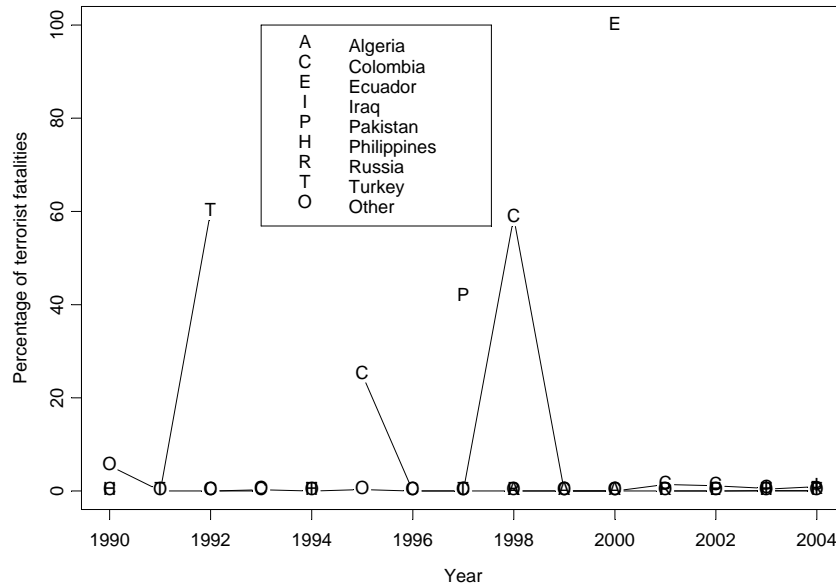


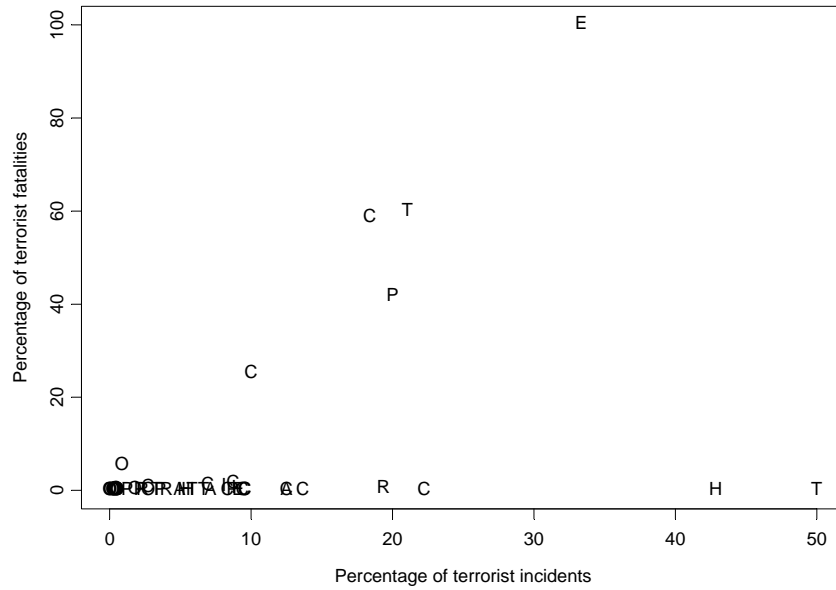
Figure 55. Percentage of terrorist-related fatalities from oil and gas incidents, 1990 – 2005: All countries



It is apparent that except for a few isolated times, fatalities related to oil/gas attacks constitute a relatively small proportion of terrorist-related fatalities.

As expected, there is a connection between fatality rate (that is, percentage of terrorist fatalities from oil/gas attacks) and incident rate (that is, percentage of incidents that are oil/gas attacks). The plot below shows this relationship.

Figure 56. Percentage of terrorist-related fatalities from oil and gas incidents related to percentage of terrorist-related incidents from oil and gas attacks, 1990 - 2005



With the exception of the Philippines in 1994 and Turkey in 1992, where the three oil/gas attacks (out of 7 total incidents) and one oil/gas attack (out of two total incidents), respectively, led to no deaths, there is a clear pattern that countries/years where more incidents were oil/gas related also had a higher percentage of fatalities that were oil/gas related; the correlation of the two variables (omitting the two unusual points) is higher than .7.



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## SECTION 4: INJURIES

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Over the period 1990-2005 there were 208 injuries associated with terrorist attacks on the oil and gas sector recorded in the MIPT database.

### 4.1. Number of injuries

The plots of injuries associated with terrorist attacks on the oil and gas sector are shown below.

Figure 57. Number of injuries from oil and gas incidents, 1990 – 2005: Algeria

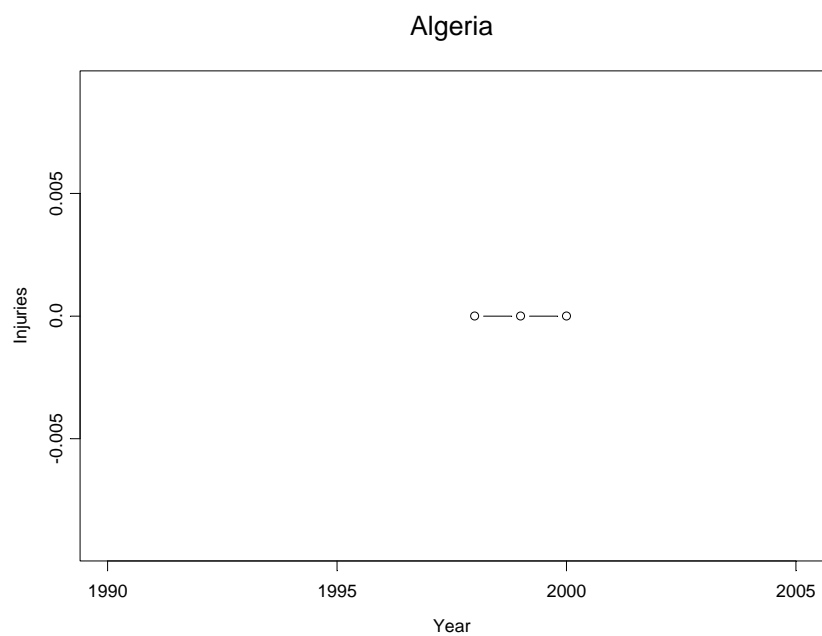


Figure 58. Number of injuries from oil and gas incidents, 1990 – 2005: Colombia

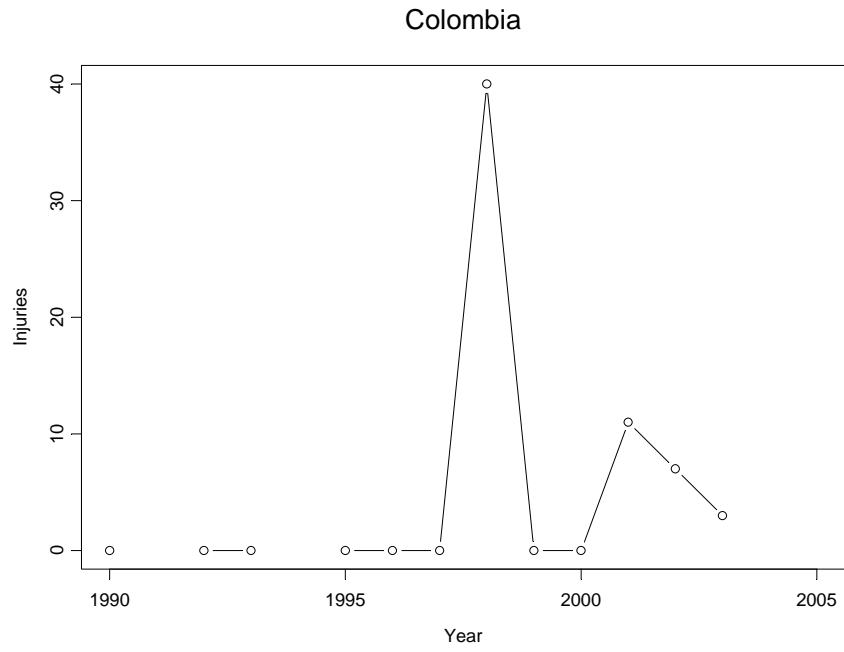


Figure 59. Number of injuries from oil and gas incidents, 1990 – 2005: Ecuador

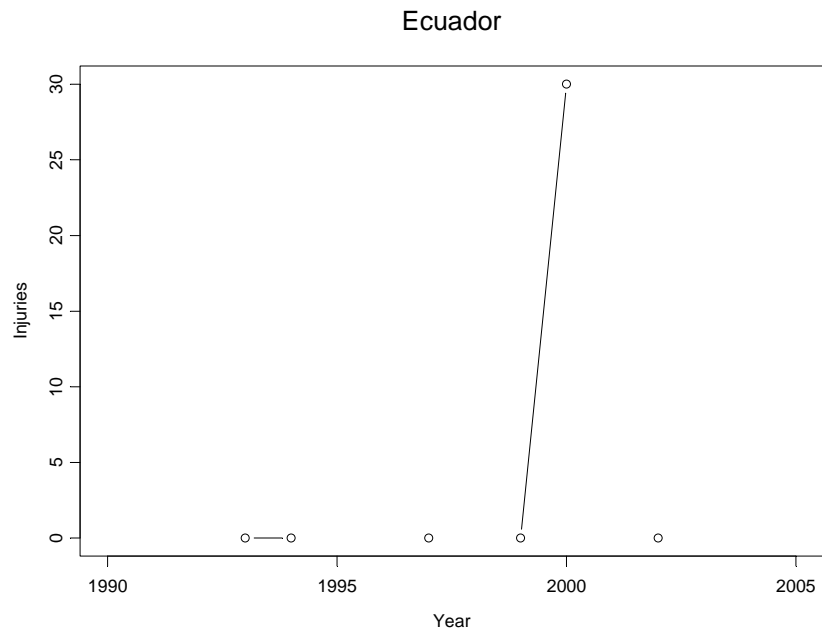


Figure 60. Number of injuries from oil and gas incidents, 1990 – 2005: Iraq

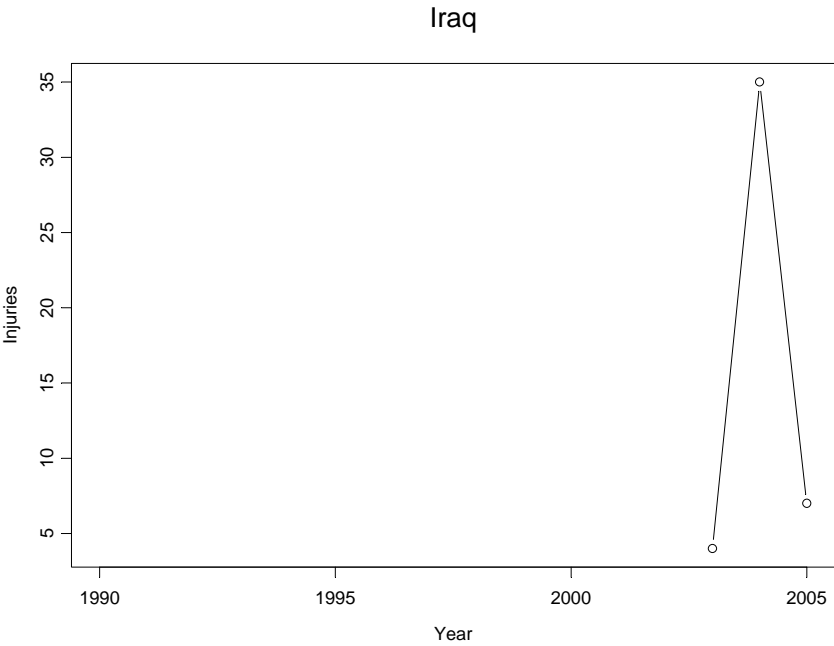


Figure 61. Number of injuries from oil and gas incidents, 1990 – 2005: Pakistan

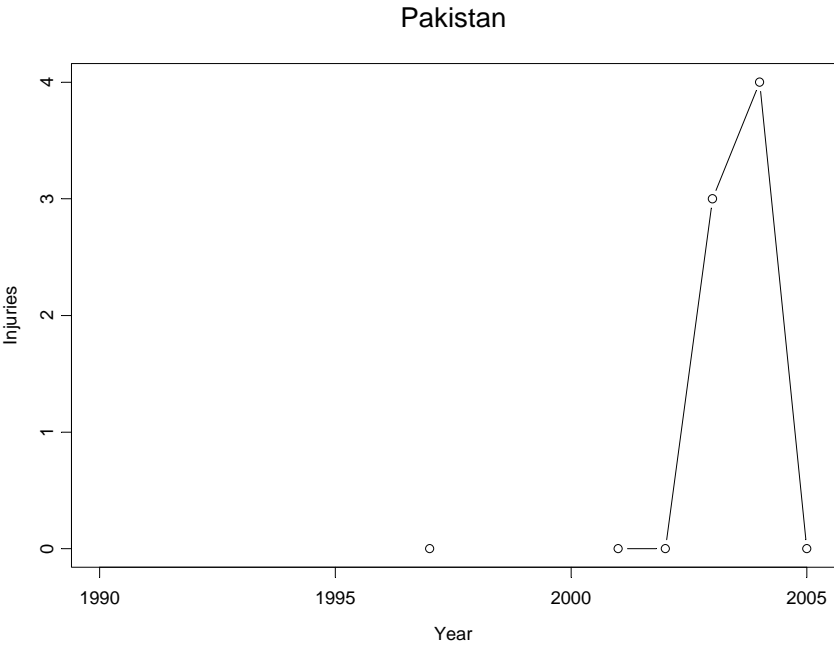


Figure 62. Number of injuries from oil and gas incidents, 1990 – 2005: Philippines

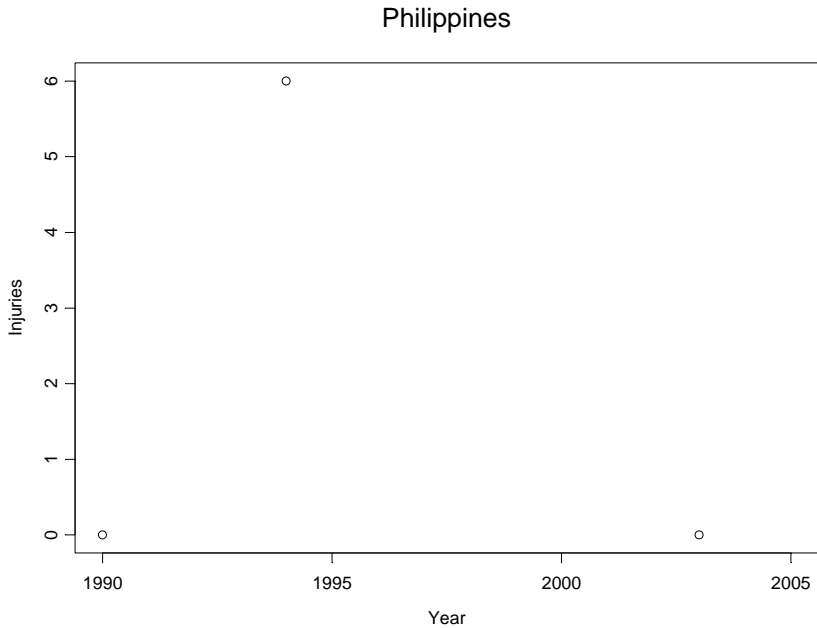


Figure 63. Number of injuries from oil and gas incidents, 1990 – 2005: Russia

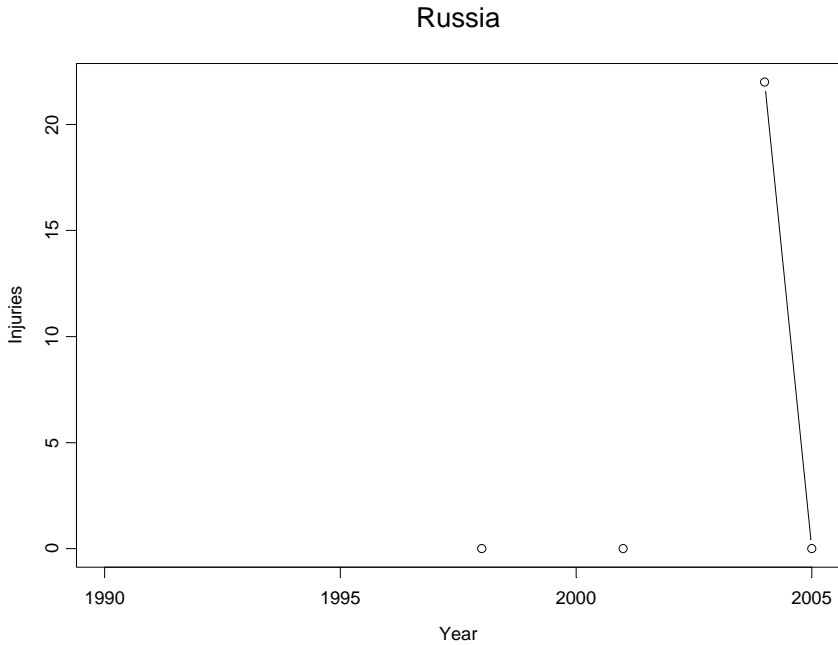


Figure 64. Number of injuries from oil and gas incidents, 1990 – 2005: Turkey

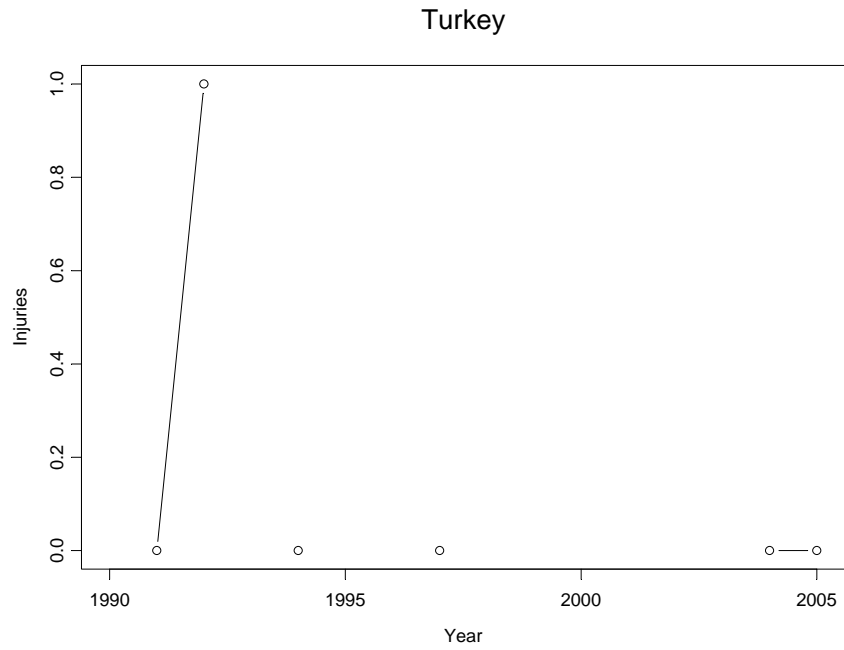


Figure 65 Number of injuries from oil and gas incidents, 1990 – 2005: Other

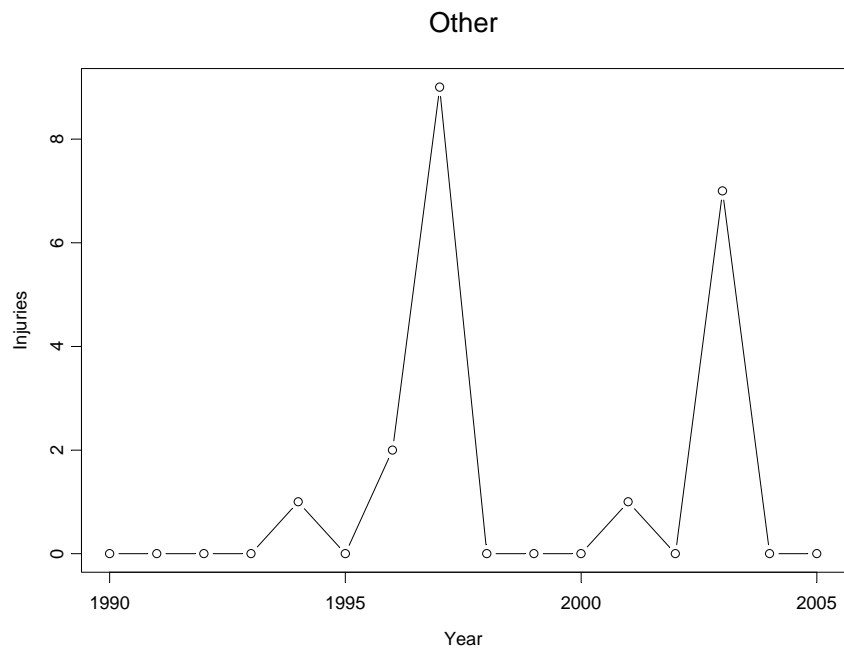
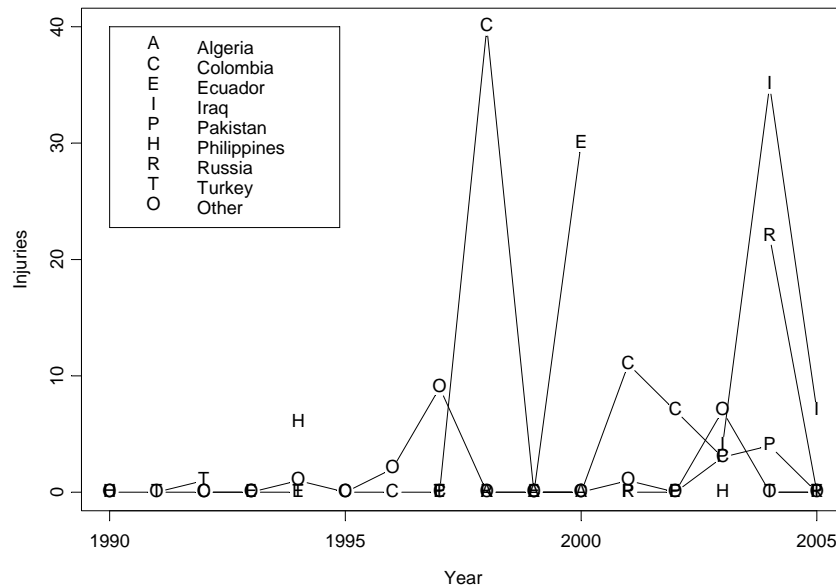
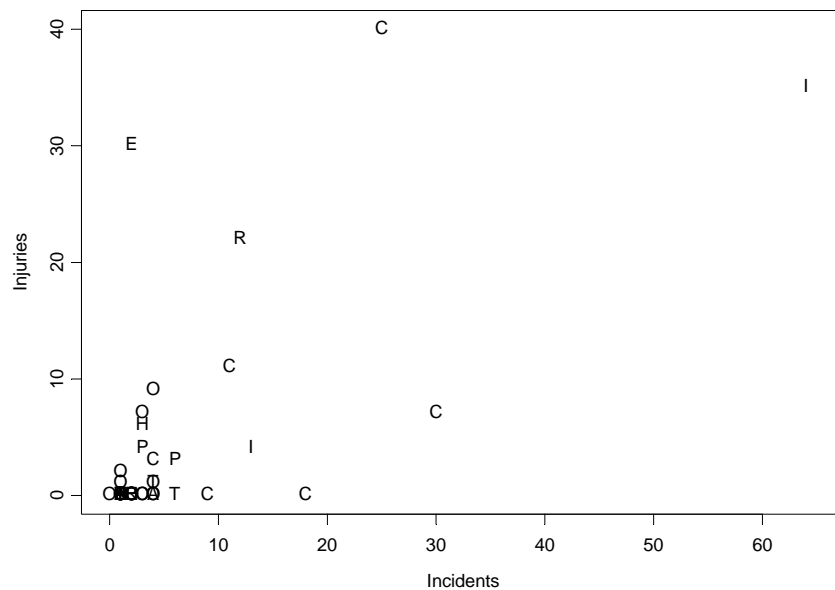


Figure 66. Number of injuries from oil and gas incidents, 1990 – 2005: All countries



The data show that injuries related to oil/gas attacks have become more common since 1998, particularly in Colombia, Ecuador, Iraq, and Russia. Again, as expected, the data show a relationship between the number of injuries and the number of incidents. The correlation between the two variables is .68. The relationship is shown in the plot below.

Figure 67. Relationship between number of oil and gas incidents and number of injuries



As was done for fatalities, the graph showing the relationship between number of injuries and number of incidents can be simplified by including some of the countries with relatively low numbers of incidents in the “Other” category. The simplified plot is shown below.



Figure 69. Injuries resulting from oil and gas incidents as a percentage of all injuries resulting from terrorist attacks, 1990 – 2005: Algeria

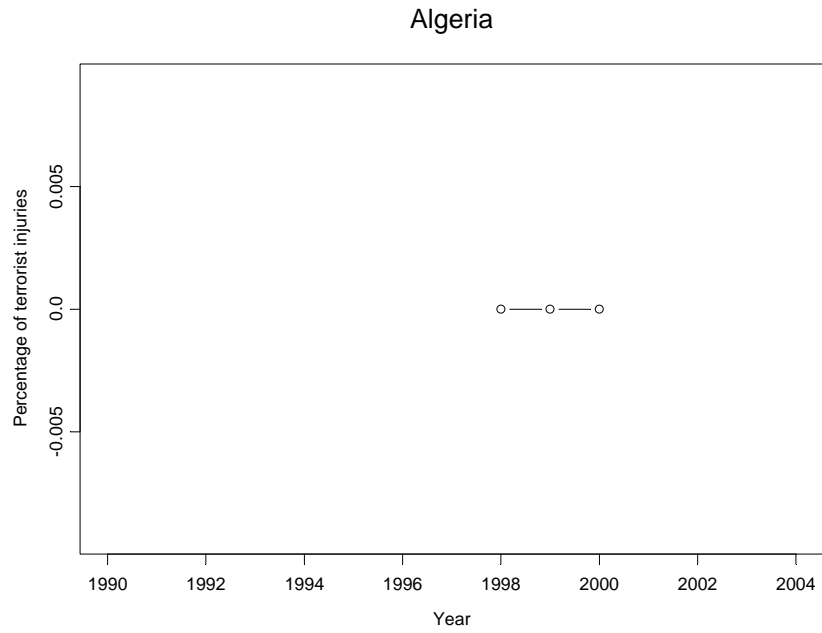


Figure 70. Injuries resulting from oil and gas incidents as a percentage of all injuries resulting from terrorist attacks, 1990 – 2005: Colombia

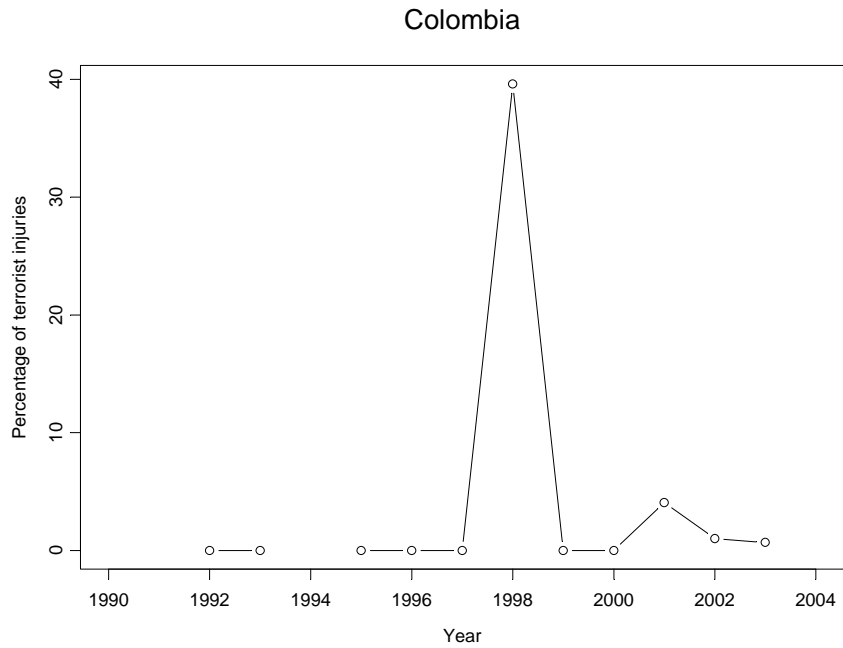


Figure 71. Injuries resulting from oil and gas incidents as a percentage of all injuries resulting from terrorist attacks, 1990 – 2005: Ecuador

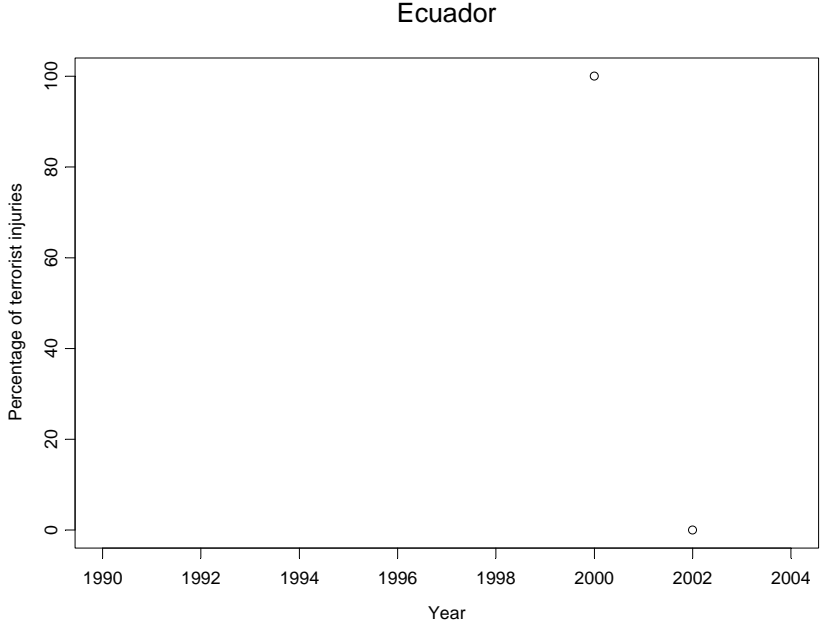


Figure 72. Injuries resulting from oil and gas incidents as a percentage of all injuries resulting from terrorist attacks, 1990 – 2005: Iraq

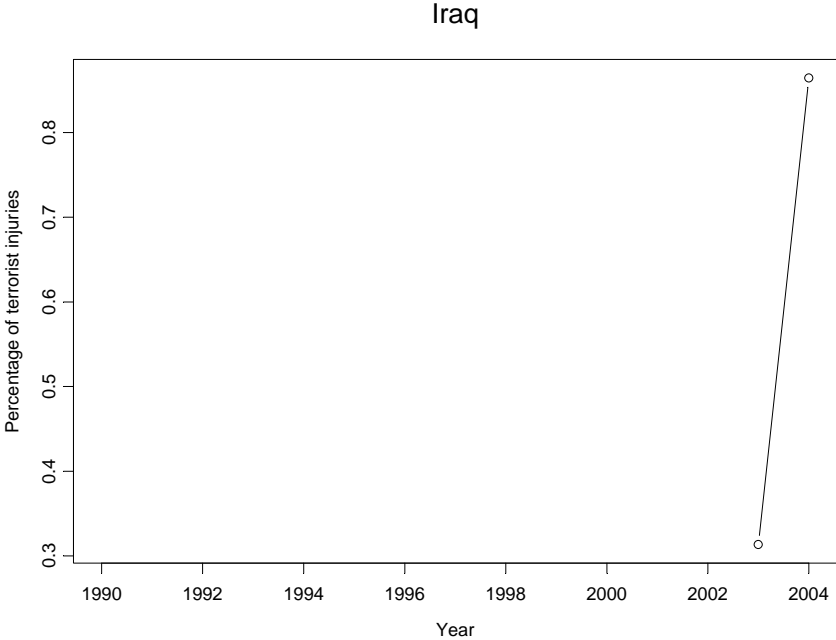


Figure 73. Injuries resulting from oil and gas incidents as a percentage of all injuries resulting from terrorist attacks, 1990 – 2005: Pakistan

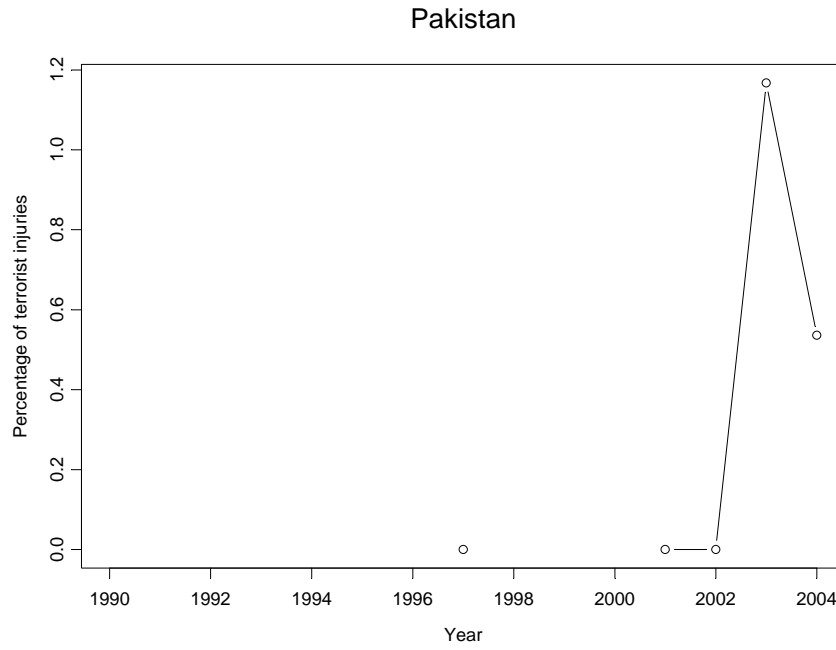


Figure 74. Injuries resulting from oil and gas incidents as a percentage of all injuries resulting from terrorist attacks, 1990 – 2005: Philippines

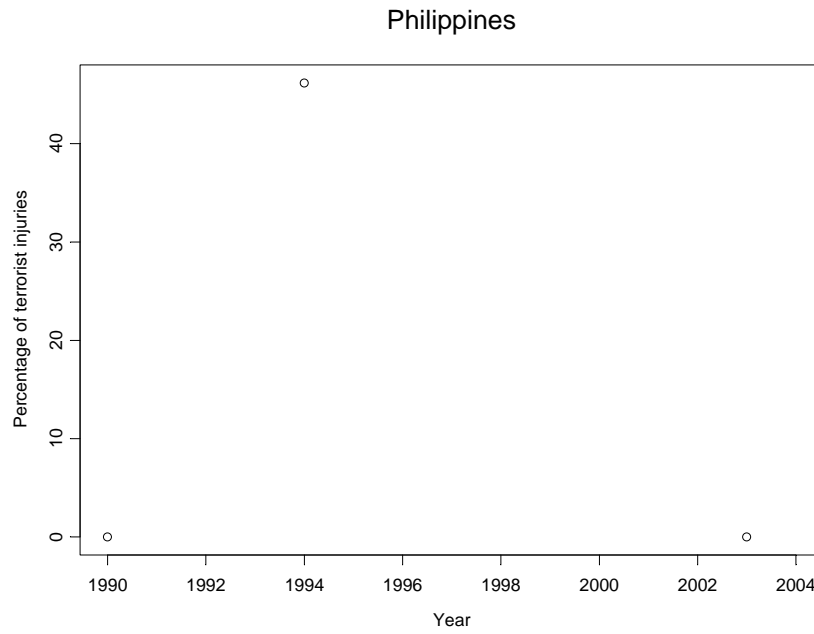


Figure 75. Injuries resulting from oil and gas incidents as a percentage of all injuries resulting from terrorist attacks, 1990 – 2005: Russia

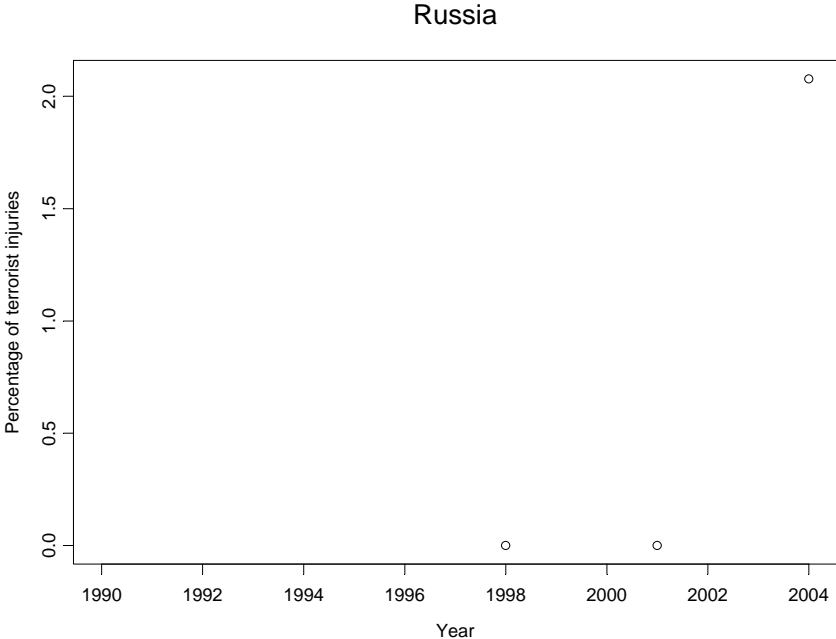


Figure 76. Injuries resulting from oil and gas incidents as a percentage of all injuries resulting from terrorist attacks, 1990 – 2005: Turkey

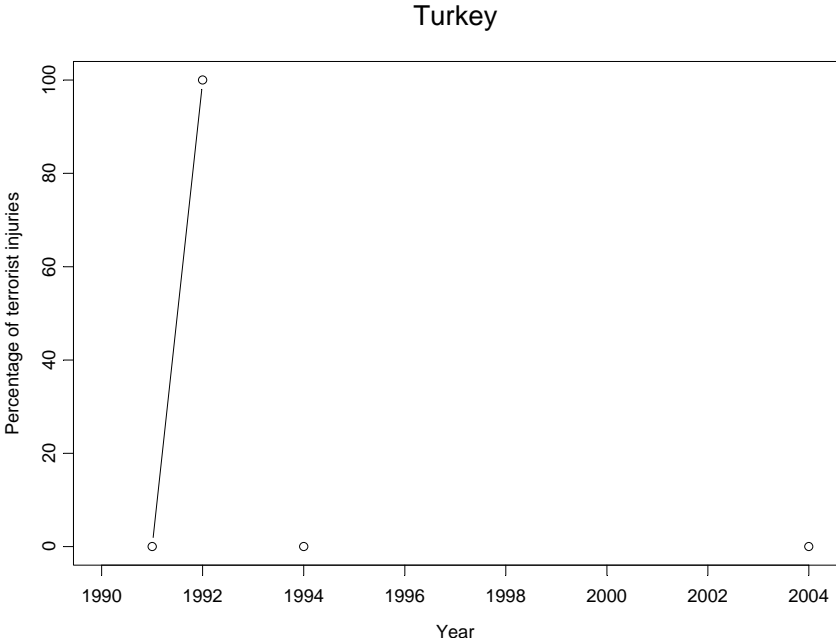


Figure 77. Injuries resulting from oil and gas incidents as a percentage of all injuries resulting from terrorist attacks, 1990 – 2005: Other

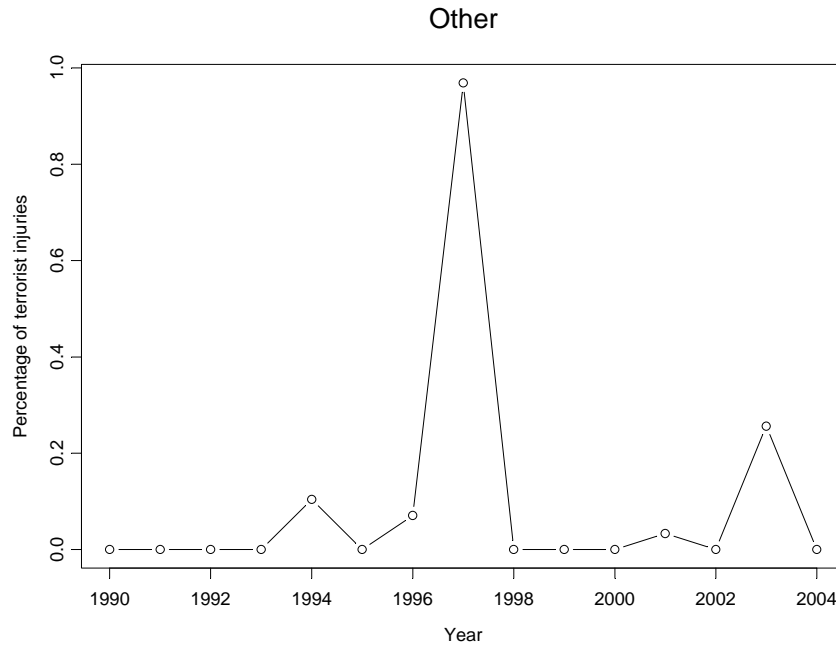
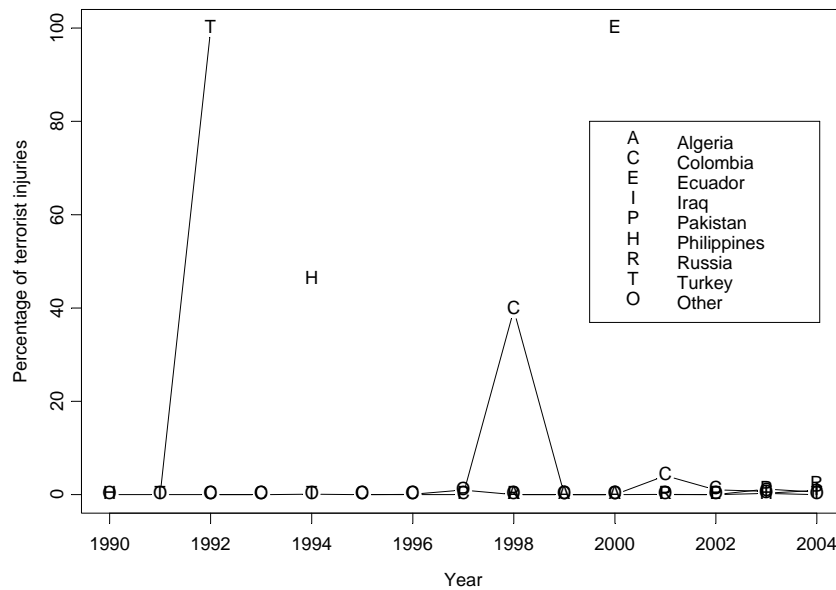


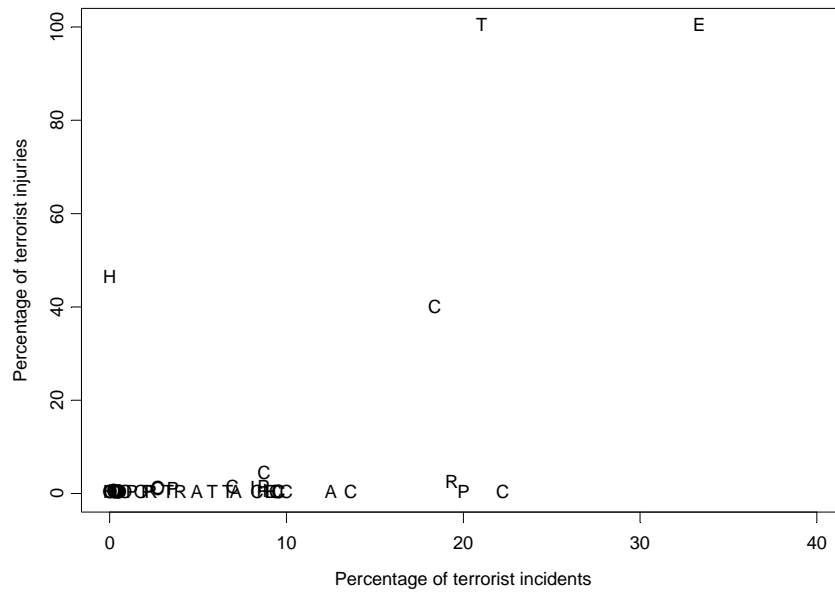
Figure 78. Injuries resulting from oil and gas incidents as a percentage of all injuries resulting from terrorist attacks, 1990 – 2005: All countries



In only four countries and in only four years (countries/years) were injuries from oil/gas attacks an appreciable proportion of total terrorist-related injuries: Colombia in 1998, Ecuador in 2000, the Philippines in 1994, and Turkey in 1992.

As would be expected, those four countries/years dominate the relationship between injury proportion and incident proportion; with them the correlation between the two variables is .66, but without them it is only .23. The next plot shows this relationship.

Figure 79. Relationship between injury percentage and incident percentage in oil and gas attacks 1990 - 2005

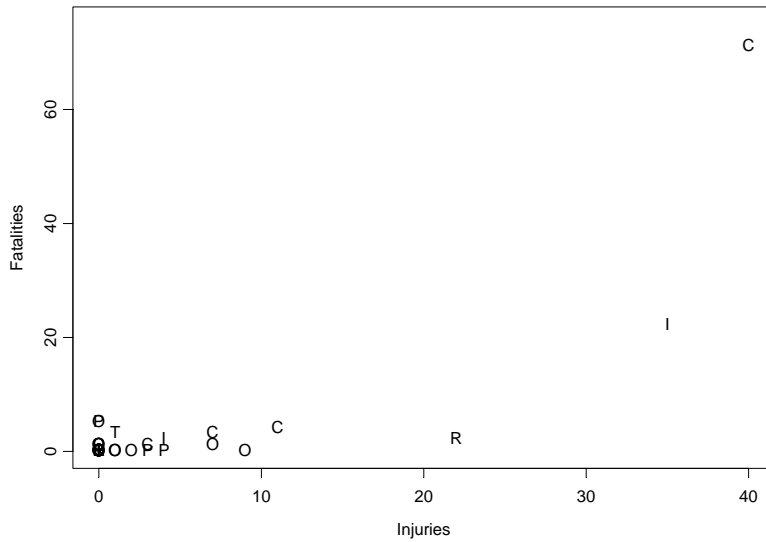




## SECTION 5: FATALITIES AND INJURIES

This section examines the relationship between fatalities and injuries in the terrorist attacks on the oil and gas sector. The plot below shows the number of fatalities versus the number of injuries.

Figure 80. Relationship between number of fatalities versus number of injuries in oil and gas attacks 1990 - 2005



There is a relationship here of moderate strength (the correlation between the two variables is .61). A least squares model for the relationship is

$$E(\text{Fatalities}) = 0.45 + 0.18 * \text{Injuries},$$

implying that five additional injuries is associated with roughly one additional death.

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## SECTION 6: COMPONENTS ATTACKED

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This section summarizes the data on the types of components targeted in the terrorist attacks against the oil and gas sector. The components included in the MIPT data are shown in the table below.

Table 1. Components targeted in terrorist attacks against oil and gas, 1990 – 2005

		Percent of total
<b>Administration</b>	<b>32</b>	<b>8.63%</b>
Human Resources	20	
Office	11	
Transportation	1	
<b>Depot</b>	<b>1</b>	<b>0.27%</b>
<b>Distribution</b>	<b>258</b>	<b>69.54%</b>
Distribution Center	2	
Distribution Substation	1	
Filling Station	4	
Pipeline	247	
Pipeline (valve)	2	
Pipeline (pressure control point)	1	
Pumping Station	1	
<b>Flow Station</b>	<b>1</b>	<b>0.27%</b>
<b>Gas Cylinder</b>	<b>1</b>	<b>0.27%</b>
<b>Oil Facility</b>	<b>5</b>	<b>1.35%</b>
<b>Production</b>	<b>56</b>	<b>15.09%</b>
Camp	1	
Equipment	2	
Facility	1	
Gas Field	2	
Natural Gas Field	1	
Oil Field	6	
Oil Field (pump)	1	
Oil Wells	5	
Prospecting Camp	1	
Refinery	36	
<b>Site</b>	<b>1</b>	<b>0.27%</b>
<b>Storage</b>	<b>9</b>	<b>2.43%</b>
Fuel Tank	2	
Reservoir	1	
Storage Facility	2	
Storage Tanks	4	

Transport	7	1.89%
Tanker	4	
Train	1	
Truck	1	
Terminal	1	
Total number of components attacked 371		

Over this period the MIPT data has information about 371 components attacked during the terrorist incidents. The most common components targeted are distribution facilities (69.5%) and production facilities (15.1%). This is also typical of other types of energy facilities in the MIPT database. Although the damage done is not clearly a function of the type of component affected, this finding does indicate that a simultaneous attack on multiple components that are relatively accessible, such as distribution facilities, could produce severe area-wide damage.

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## SECTION 7: CONCLUSIONS

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The results of the analyses suggest that in the last few years the number of attacks on oil and gas facilities have increased in countries with Islamic terrorist groups that pose a threat to U.S. interests. Although Colombia has the highest number of attacks, they appear to have peaked in 2001 and may be going down.

The frequency of attacks on the oil and gas sector relative to the total number of attacks on all other sectors reported in the database does not show a clear trend by country, although it increased in Iraq, Pakistan, Turkey, and Russia in 2004. In general, attacks on the oil and gas sector tend to be a relatively small proportion of total terrorist attacks.

The analysis of the MIPT data also examined the number of people injured and killed during the attacks on the oil and gas industry. The number of injuries increases with the number of attacks but the number of fatalities does not show a clear relationship to the number of attacks.

The linear regressions included in the analysis suggest that roughly 1 additional injury in these attacks is associated with 2 additional incidents and approximately five additional injuries are associated with roughly one additional death.

The MIPT database also has information about the components attacked during the incidents. According to the data the most common components targeted are distribution facilities (69.5%) and production facilities (15.1%). This is significant in revealing what modes and locations of attack tend to be easier to carry out.

The analysis of attacks at the geographic level of the country is useful given that a smaller geographic level would generally yield too few events, and larger geographic areas such as regions are not useful, since they usually reflect patterns in a single country.

Although the terrorist attacks on the oil and gas sector are a relatively small proportion of terrorist attacks overall, the data show that a significant number of attacks have occurred over the period 1990-2005. The number of attacks on the sector appears to be increasing in some countries. Although these are physical attacks rather than SCADA attacks, the data suggest that the sector is vulnerable. If terrorist groups feel that carrying out a physical attack within the United States is too difficult they could turn their attention to other vulnerabilities such as SCADA systems.